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NAVAL AVIATION MEDICINE.[1]

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In 1908 the exploits of the German Zeppelin Service had not passed unnoticed by the British Admiralty, and construction of No. 1 Rigid Naval Airship was put in hand. This airship subsequently broke her back in 1911, and after a court of inquiry naval development of rigid airships was abandoned.

In 1911 the first two Royal Navy officers qualified as pilots, with Admiralty approval, having taken a six-weeks flying course with Mr. Short—for a fee of £20. No flying training took place in a wind velocity of over four miles per hour, and the Admiralty stipulated that there should be no flying on Sundays. One of these officers, in December, 1911, first made a successful flight in a Short S38 pusher from a platform on board H.M.S. *Africa*, at anchor at Sheerness. In May, 1912, the experiment was repeated from H.M.S. *Hibernia*, while the ship was steaming at 15 knots.

In May, 1912, also the Royal Flying Corps was formed, comprising a naval wing with headquarters at Eastchurch, and a military wing with headquarters at Farnborough. The Royal Naval Air Service was officially established in July, 1914, and in this month also the first aircraft carrying a torpedo (weighing 900 pounds) took off from the water. In 1917 a Sopwith Pup made the first deck-landing on the 228-foot flight deck of H.M.S. *Furious*, but the pilot was killed at his second deck-landing in the same aircraft.

By 1917 most senior flying officers of the Royal Naval Air Service and Royal Flying Corps were pressing for the creation of a new flying service which would be entirely independent of both the Admiralty and the War Office. On April 1, 1918, the Royal Air Force came into being, formed from the Royal Flying Corps and the Royal Naval Air Service—the latter's contribution being 500 officers, 50,000 ratings, and over 2800 aircraft.

[1] Read at a meeting of the Special Group on Aviation Medicine (British Medical Association) on June 17, 1952, at Melbourne.

The medical officers attached to both the Royal Naval Air Service and the Royal Flying Corps were, by this time, "aware of certain ill effects on aircrew flying at over 15,000 feet, and on inexperienced aircrew flying at a lower ceiling". It was urged that there should be an "especially strict medical examination of pilot candidates, having regard, *inter alia*, to the eyes, ears, nose and throat, and cardiac and renal efficiency".

The titles of the new Royal Air Force ranks had not then been decided. The first medical director-general appointed to the Royal Air Force was a naval medical officer who had been Assistant Director-General, Admiralty, and concerned with the medical aspects of aviation. This medical officer was given the rank of major-general, Royal Air Force, and he subsequently reverted to the Royal Navy while the Royal Air Force was still using army rank titles. He finally retired as a surgeon-captain but still retained his dual rank of major-general, Royal Air Force. He probably had the unique distinction of being the only major-general who had seen over thirty years' service in the Royal Navy.

The creation of the new Royal Air Force medical services, with medical officers drawn from the navy, the army, and the colonial and civil services, undoubtedly did much towards creating a more efficient medical care of flying personnel and engendered a keenness for knowledge and research with all the special talent available under the impetus of war.

In 1924 the Fleet Air Arm was created under the dual control of the Admiralty and the Air Ministry—the navy providing 70% of the pilots, all the observers and telegraphist-gunners, and the aircraft-carriers. The Royal Air Force provided 30% of the pilots, all the maintenance and ground staffs, the aircraft and the airfields. Royal Navy pilots in the Fleet Air Arm held a Royal Air Force commission in addition to their naval commissions.

In May, 1939, the Admiralty assumed complete control of the Fleet Air Arm, and during the Second World War a large number of Australians, New Zealanders and Canadians served with distinction in the Royal Naval Volunteer Reserve with the Fleet Air Arm.

It became obvious that there was a tendency for the Fleet Air Arm to become an offshoot—almost a separate service—instead of being an integral part of the navy. The majority of the officers were flyers with few, if any, naval qualifications, instead of naval officers who had specialized in flying. In 1946 the Admiralty announced that the term "Naval Aviation" would supersede "Fleet Air Arm".

In this country a number of Royal Australian Navy officers were first appointed to the Fleet Air Arm, but were later seconded to the Royal Australian Air Force in the late 1920's, for training as pilots for cruiser-borne aircraft. These officers were also given Royal Australian Air Force rank.

In 1928 the seaplane carrier H.M.A.S. *Albatross* was commissioned, the pilots and maintenance staff being provided by the Royal Australian Air Force. The *Albatross*, paid off in 1933, was taken over by the Admiralty in 1938. Ten years later we saw the rebirth of naval aviation in Australia when the light fleet carrier H.M.A.S. *Sydney* was completed, and the naval air station at Nowra (fittingly named H.M.A.S. *Albatross*) was opened. From the achievements of H.M.A.S. *Sydney* in the Korean theatre, it can safely be said that naval aviation in the Royal Australian Navy is now established on a firm footing.

The Function of Naval Aviation.

So far I have dealt with only the historical side of naval aviation. What is its function? Briefly, to complete the role of the navy. Naval aviation's primary function is to provide air power in maritime areas which are out of effective or economical range of shore-based aircraft—by acting as an integral part of the navy in keeping open lines of sea communications and in cutting those of the enemy. Subsidiary functions may call upon naval aviation to give air support to the army or to strike targets included in the strategical or tactical plan.

The Aircraft-carrier.

As carriers are designed to operate aircraft, all other functions are subordinated to this. The carrier must have a large amount of accommodation because of the large crew required to run the various pieces of apparatus necessary to operate the aircraft. It must have a high speed, adequate hangar space and a stable flight deck with the necessary flight-deck equipment—arresting gear, catapults and safety barriers. With modern fast and heavy aircraft this means that there is less space, and therefore fewer amenities for the aircrew. This is greatest in the light fleet carriers, where the standard of accommodation is not as good as in other types of warship.

Each carrier is commanded by a captain, who is responsible for the fighting of his ship. He is assisted, so far as air operations are concerned, by a commander (air), who is the immediate head of the ship's air department. Under the commander (air) are the lieutenant-commander (operations), the direction officer and the lieutenant-commander (flying).

The batsman, whose proper title is the landing signals officer, is stationed on a small platform on the port side of the flight deck aft. He has the ultimate responsibility of ensuring that the pilot makes a successful landing. The landing signals officer gives informative and mandatory signals to the pilot with a pair of bats, the colour of which may be yellow or cerise. For night flying he uses a pair of illuminated bats. The landing signals officer and the naval pilot must be first-class at their job, as indeed must be every man of the carrier's personnel. Whenever flying is taking place there are always a medical officer and sick berth staff on duty on the flight deck. They must be familiar with the cockpit layout and be able to unfasten the aircrew's safety belt and parachute harness in an instant. Every carrier has a catapult, which is becoming more frequently used and is likely to become the normally accepted method of launching aircraft. The Admiralty is even now considering vertical launchings. Rocket-assisted take-offs are used in the event of catapult failure.

The time sequence between conventional catapult launchings in a well-trained carrier averages forty-five seconds compared with the average twelve seconds between normal free take-offs. Britain has been well ahead in the development of catapults, and the new steam-operated one which was recently installed in H.M.S. *Perseus* is likely to become standard procedure aboard British, Commonwealth and American carriers. This new catapult was designed to keep abreast of the demands made by the rapid advance of jet propulsion, and the tendency towards bigger and heavier aircraft. Trials began in 1951. The first piloted aircraft—a Firefly—was flown off in July, 1951. The pilot reported that the catapult had much greater but smoother acceleration than any conventional type, and gave a higher flying speed off the deck. The inventor himself says: "Although acceleration is higher, the build-up is steadier, and I found it more tolerable physiologically." H.M.S. *Perseus* has successfully launched Fireflies and Sea Furies while the ship was secured alongside.

The Medical Organization.

The senior medical officer of a carrier or air station is normally of surgeon commander's rank. He is responsible for (i) the fitness, well-being and comfort of the ship's flying personnel and of the ship's company, (ii) the hygiene of the ship, (iii) the care of the sick, (iv) the organization of first-aid posts, training of first-aid parties and medical organization of action stations, and (v) the medical aspects of radiological defence. He must also be familiar with industrial processes and the relevant legislation. He must see that the aircrew get the right food at the right time, and sufficient sleep. It is his duty to ensure that all aircrew are well taught on the effects of anoxia and the use of oxygen, night vision, acceleration and deceleration, the effects of G, the principles of first aid and hygiene in

flight, the hygiene of survival, the use and abuse of flying clothing, and high-altitude and supersonic flight. It is the policy in the Royal Australian Navy to have at least one medical officer who is qualified in aviation medicine in every carrier and on every naval air station.

This specialist officer is responsible for all aircrew, and he should be present at all briefings and debriefings if possible. He must know his squadrons both professionally and socially, and take every opportunity to fly with them himself. Many naval medical officers are qualified pilots, and this is fully encouraged in the Royal Australian Navy.

There is a very active gliding club at the Naval Air Station at Nowra, which has its own medical officer under training as a glider pilot.

In the United States Navy, medical officers, after qualifying in aviation medicine, are designated naval flight surgeons and are appointed to Air Groups. They are given special wings, and this probably has good psychological value.

The Naval Air Medical Schools.

The Royal Navy Air Medical School works in close cooperation with the Royal Air Force Institute of Aviation Medicine, but does not duplicate its work. In 1949 the Royal Australian Navy School of Air Medicine was established at the Naval Air Station, Nowra, and it maintains close liaison both with the Royal Navy Air Medical School and with the Royal Australian Navy Safety Equipment and Survival School. It is designed to instruct naval medical officers in aviation medicine and to investigate special aviation problems of the naval service. All aircrew have to undergo the high-altitude tests in the school's high-altitude decompression chamber, and are given experience in the effects of explosive decompression. The preservation of life at sea is of supreme importance to the navy, and the air medical schools are constantly carrying out trials of new flying clothing and life-saving equipment.

The Royal Australian Navy squadrons embarked in H.M.A.S. *Sydney* during the recent Korean operations were equipped with the new type of immersion suit which had been successfully tested under Arctic conditions by the Royal Navy Air Medical School. Another development has been the solar still, which effectively makes a pint of fresh water from sea water in a matter of a few hours. It is likely to become standard equipment for naval aircrew. Trials are also being carried out of a new type of flying crash helmet. At Nowra, the Royal Australian Navy Safety Equipment and Survival School organizes frequent bush survival exercises. These are designed both to train aircrew to live off the land and to fend for themselves, and also to train naval personnel in search and rescue organization, both from the land and from the air. A "Land Rover" has been constructed as an ambulance for bush rescue work at Nowra. It holds two stretchers, one of which is of the Stoke's litter type, and two seats in addition to the driver's seat. This vehicle, with its four-wheel drive, has proved to be very effective in its ability to convey casualties over rough terrain, and to penetrate deeply into the bush.

Air-Sea Rescue.

A naval search and rescue flotilla of high-powered 63-foot vessels, capable of speeds of over 30 knots, is based at Jervis Bay. The crews are all trained in first aid, and each vessel has been fitted for artificial resuscitation by the Eve's rocking method—by means of a cross-bar which can be inserted athwartships in the after-cabin. To this bar can be fitted a Stoke's litter type stretcher. Amphibious Sea Otter aircraft are also used by both the carriers and shore bases. Until recently all carriers operated with attendant destroyers—which, together with the Sea Otters, are being replaced by helicopters. In the Korean operations the *Sydney* helicopter proved of enormous value in rescuing aircrew who had been forced down. "Ditched" aircrew effectively displayed fluorescent panels of material, coloured either yellow or cerise, depending on the background. These panels were easily picked out by the searching aircraft, whether displayed at sea or on land.

Flying Stress and Fatigue in Naval Aircrew.

The casualties in the navy due to flying strain are heavier than those in the air force, and occur in the following ways.

Before the squadrons embark in the carrier each pilot must undergo intensive training in air-field dummy deck-landings, known as A.D.D.L.'s, before he is allowed to go to the deck. A flight deck is marked out on the runway, and the pilot has to make a dummy deck-landing circuit, being brought on to the "deck" by the landing signals officer in the usual manner. He goes on doing this in a session of six A.D.D.L. circuits consecutively. The same medical officer should be present whenever aircrew are doing these A.D.D.L. sessions—for in this way he can get to know each pilot individually and can study his reactions and those of the landing signals officer over the whole working-up period. I have watched many thousands of A.D.D.L.'s and deck-landings, and I believe that success or failure depends not only on the attitude of the aircraft, but also on the attitude of mind of the pilot. On some days he will do a good A.D.D.L. session, on other days a bad or indifferent one. Three phases seem to me to occur during the work-up period. In the first phase the pilot is supremely confident in his own ability to deck-land. Mistakes do not worry him, and in any case the batsman will get him there. This phase soon passes altogether. At the height of the work-up period he is now anything but self-confident, and his performances may become indifferent—even to the point of ignoring the landing signals officer's signals completely. In the third phase the pilot suddenly remembers all he has been taught and discovers that the landing signals officer knows best. He now goes on to deck-landing practice in the carrier itself, and he is then ready for operational flying. Each time the squadrons disembark, the whole cycle of events is repeated before they become carrier-borne again.

The landing signals officer himself must be a pilot with above average deck-landing qualities. The Landing Signals Officers' School at Yeovilton has a squadron known as "clockwork mice" because their working life consists of take-off, circuit and land-on repetition. Each pilot of this squadron is capable of doing A.D.D.L.'s and actual deck-landings without the aid of a batsman, so that he can accept incorrect batting signals and show the pupil batsman his mistakes. These pilots are, in fact, capable of flying badly perfectly. The batsman is an actor who holds the stage. He gets across to his audience—the pilot—his whole personality, not by the spoken word, but by every movement of his body. The successful issue in deck-landing rests on the correct interpretation by the pilot of the batsman's act.

Most naval flying is done in close formation, usually over the sea, and in single-engined aircraft. The naval pilot is constantly scanning the sea for relatively small objects—a tiring procedure if there is any glare on the surface of the water. At the end of each flight he has to deck-land. Once he has rejoined his carrier he becomes a member of the ship's company, with possibly other duties to perform; and he is exposed to the common danger, especially in time of war. Carrier night-flying requires much training and special types of aircraft.

Other contributory factors to fatigue of naval aircrew are: (i) being briefed too early, (ii) waiting too long for the take-off, (iii) cancellation of a sortie when the aircrew are keyed up, (iv) vibration and noise, not only of the aircraft, but also of the carrier, (v) the necessarily cramped living quarters of the carrier with lack of individual privacy, (vi) separation from wife and family and no fixed abode.

The medical officer must watch for any sign of breakdown or change in the behaviour of aircrew for whom he is responsible. Perhaps the pilot has been flying too long with the same squadron, or too long with a front-line squadron. A word from the medical officer, a change of appointment, or a change of environment may save a useful flying career.

There is no hard and fast upper age limit laid down for the naval aviator, but it is unusual for him to remain in a front-line squadron after the age of thirty-five years.

The Selection of Naval Flying Personnel.

The naval aviator is a naval officer who has specialized in flying. He must possess all the attributes of a general service naval officer and be a good seaman, a good navigator and a good engineer. At some time in his career he must be prepared to take command of a sea-going vessel.

The physical and visual standards required are necessarily rigid in naval aviation—when modern aircraft are being designed both for deck-landing and to operate effectively at altitudes in excess of 40,000 feet, and at speeds greater than that of sound. Recognizing the trend and problems in post-war aviation—the limited human factor, the pilot who must fly and successfully operate these modern weapons of war—the United States Navy began, in 1947, a large-scale military psychological test programme to develop and improve methods and techniques for the selection of candidates for operational flight training. This project, under joint navy-air force supervision, was officially identified as the Pilot Candidate Selection Research Project.

The experimental population, comprising 2130 midshipmen who had satisfied currently prescribed requirements for acceptance into naval aviation, were given 35 paper and pencil tests and 19 psychomotor tests during their first two weeks in the pre-flight programme. Data have been gathered from those who failed or succeeded at each stage in the training programme, which is divided into (i) the pre-flight phase, (ii) the basic phase, and (iii) the advanced phase.

The fleet aircraft squadron commanders will ultimately report on the competence and efficiency of the newly designated naval aviators. It is hoped that, by correlating the original test data with the reports of the squadron commanders, very important contributions will be possible in the predicting and selecting of operational flying personnel.

Conclusion.

British naval aviation has achieved much. In 1944 the first twin-engined deck-landing in the world was carried out by a hooked Mosquito on H.M.S. *Indefatigable*, a fleet carrier. In 1946 the first jet aircraft—a hooked Vampire—deck-landed on H.M.S. *Ocean*, a light fleet carrier. We also carried out the first prop-jet deck-landing with the Gannet. In 1950 successful trials with Britain's new steam catapult were begun in H.M.S. *Perseus*.

None of this could have been done without the applied principles and practice of naval aviation medicine.

Finally, I will quote from a paper presented at the 1950 annual meeting of the Aero Medical Association in Chicago by Captain W. E. Kellum, M.C., U.S.N., and J. W. Dunlap, Ph.D., entitled "The Typical Navy Flight Surgeon". They say: ". . .the young doctor who becomes a [naval] flight surgeon, whether regular or reserve, can look forward to a life of challenge, one which will involve both drudgery and glamour, excitement and routine, good fellowship, advancement, the practice of clinical medicine, the opportunity to work in a highly specialized field, and ultimately to become that sad specimen of a doctor—an administrator." Although an administrator, and no longer so young, I have enjoyed every moment of it.

Acknowledgement.

I wish to thank the Australian Commonwealth Naval Board and Surgeon Rear-Admiral D. A. Pritchard, C.B.E., M.B., M.Ch., M.R.C.P., F.R.A.C.P., D.T.M., Q.H.P., Director of Naval Medical Services, Royal Australian Navy, for permission to publish this paper.

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ACUTE INFECTIONS OF THE FINGERS AND HAND.

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SINCE the advent of antibiotics acute infections of the fingers and hand have ceased to menace life and limb; but, as was stated by Bailey (1952), they "still cause much disability, and impose an economic burden on the community which can and should be reduced".

When one is considering how best to achieve this reduction, two factors stand out as major obstacles. Firstly, the pathology of these lesions generally is not clearly understood; secondly, the treatment in most places is inadequate.

It is the object of this paper to clarify the underlying pathology, to define a rational method of treatment based on the knowledge and understanding of that pathology, and to give the results of such treatment as carried out over a period of one year at the clinic for the treatment of acute infections of the fingers and hand at Saint Vincent's Hospital.

PATHOLOGY.

In accordance with the teachings of Kanavel (1939), it is commonly believed and indeed still taught in most standard text-books that infection in the fingers and hand differs from infection elsewhere, in that the barriers to the spread of infection are largely anatomical and not the temporary barriers set up by the tissue reaction to the infecting organism. This, of course, is erroneous. The common causative organism in infections of the fingers and hand is the *Staphylococcus aureus*, which as a rule reaches the site of infection through some break in the continuity of the skin; here it evokes the usual tissue reaction, dilatation of surrounding capillaries, exudation of lymph and emigration of leucocytes, which is the stage of cellulitis. Depending on the balance between the resistance of the host and the virulence of the organism, the infection may be overcome—the inflammation having undergone resolution—or the inflammation may progress with suppuration. The staphylococcal toxin has a necrosing effect on the tissue, so that slough may be produced in addition to pus. When this stage is reached, which is the stage of abscess, there occurs at the periphery a reactive proliferation of the connective tissue cells, with new formation of blood vessels—that is, a zone of granulation tissue forms around the abscess.

This same process goes on whether the site of infection is subcuticular, subcutaneous, in a tendon sheath, or in a palmar space. When pus and slough form, then they do so in the centre of a barrier created by the tissue reaction to the infection, and do not just fill an anatomical area such as the whole pulp space, tendon sheath or palmar space, as Kanavel was able to do with plaster of Paris injected under pressure in the cadaver.

One further commonly stated and believed error is that tension caused by infection in the pulp space causes obliteration of the terminal vessels running to the bone from the laterally placed digital arteries, and so causes necrosis and sequestration of the phalanx (Bunnell). There is no evidence to support this oft-repeated fallacy, and a lot of evidence to disprove it. It is difficult to believe that there is obliteration of blood supply in a pulp which is throbbing, and in which capillary pulsation is so easily demonstrated.

The radiographic appearance of the terminal phalanx, in cases in which it is involved, is not that of increased density, as one might expect if the blood supply was cut off, but rather one of osteoporosis associated with the hyperæmia of the adjacent inflammatory process. This often returns to normal when the inflammation subsides.

In cases in which there is bone necrosis, it is due to direct extension of infection to the bone, often brought about by ill-advised surgical trauma, and certainly never by tension within the pulp. It is this fallacy which is responsible for the current practice of early and wide incisions in pulp infections. These incisions can do no good and often lead to spreading of infection and directly damage the blood supply of the phalanx.

TYPES OF INFECTION.

The acute infections commonly met with can be divided into the following groups: (i) acute paronychia, (ii) pulp abscess, (iii) apical abscess, (iv) web abscess, (v) cellulitis, (vi) subcuticular abscess, (vii) subcutaneous abscess, (viii) carbuncle, (ix) erysipeloid, (x) tendon sheath infection, (xi) palmar "space" infection, (xii) suppurative arthritis.

The first four and the last three of these are classified according to their anatomical site on the hand, and the remainder according to the pathological basis.

Acute Paronychia.

Acute paronychia is a subcuticular infection around the nail fold. It may spread horizontally around the fold or vertically under the fold and the nail itself (Figure I).

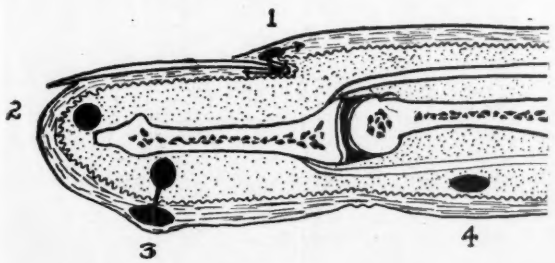

FIGURE I.
Diagram to show anatomical sites of various infections: (1) acute paronychia, subcuticular, arrows showing direction of vertical spread; (2) apical abscess; (3) pulp abscess with "collar-stud" subcuticular extension; (4) subcutaneous abscess over middle phalanx.

It is essential to remember that this is not a subcutaneous infection, and therefore no incisions into the subcutaneous tissue should be made. Rarely, paronychia may present as the subcuticular component of a collar-stud extension of a lateral pulp abscess (see Figure II).

Pulp Abscess.

Pulp abscess is a subcutaneous abscess of the pulp of the terminal segment of the finger, as in Figure I. It may spread and give rise to a collar-stud subcuticular component. If it commences laterally in the pulp, it may spread and give rise to a subcuticular abscess which presents as paronychia (Figure II).

Apical Abscess.

Apical abscess is a subcutaneous abscess occurring at the extreme tip of the pulp distal to the phalanx and tends to point under the free edge of the nail (Figure I). It is really a special type of pulp abscess, but merits distinctive classification because it runs a shorter course and is liable to less complications than the common pulp abscess.

Web Abscess.

Web abscess is an abscess in the subcutaneous tissue of the interdigital cleft, wherein lie the digital nerves and vessels which may be displaced by the enlarging abscess (Figure III). We have not seen it occur secondary to spread from the palmar space, as is often taught, nor have we seen it spread to form a palmar space abscess.

Cellulitis.

Cellulitis includes all cases in which the subcutaneous infection is aborted before pus formation occurs. Once a localized abscess forms, the condition can be grouped into one of the other headings.

Subcuticular Abscess.

Subcuticular abscess refers to the superficial, infected blister commonly seen in children, and the term is used to connote those infections in which there is no deep component (Figure IV). Paronychia is excluded from this group because of its peculiar situation.

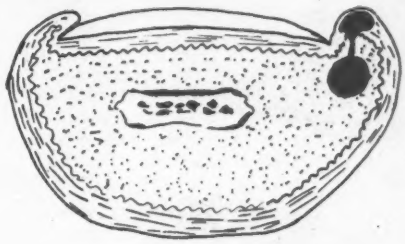

FIGURE II.
Showing lateral pulp abscess with "collar-stud" extension presenting as paronychia.

Subcutaneous Abscess.

Subcutaneous abscess refers to all other subcutaneous infections, excluding pulp, apical and web abscesses—for example, the subcutaneous abscess over the proximal or middle segment of the finger (Figure V).

FIGURE III.
Showing a typical web space infection.

Carbuncle.

Carbuncle includes those infections which occur on the dorsal surface of the fingers, hand or wrist, in relation to hair follicles. It has the usual characteristics of a carbuncle elsewhere, with multiple sinuses and much slough formation.

Erysipeloid.

Erysipeloid is a diffuse infection with the bacillus of Rosenbach, *Erysipelothrix rhusiopathiæ*. It differs from other forms of cellulitis in not going on to pus formation and having a characteristic clinical appearance and course.

It is more common than is usually believed, many cases being recognized in workers' compensation clinics. It occurs chiefly in butchers, fishmongers, greengrocers, cooks and housewives. It has a characteristic purplish-red discoloration and a clearly defined edge, and usually runs a benign course.

FIGURE IV.
Showing a subcuticular abscess.

Tendon Sheath Infection.

Tendon sheath infection or tenosynovitis is an infection within the synovial sheath of the finger. It is a rare infection and usually follows a wound which opens the tendon sheath. It is uncommon as a complication of subcutaneous infection, which often is seen to surround a tendon sheath and not infect it. However, it is very likely

FIGURE V.
Showing a subcutaneous abscess over the proximal phalanx, a subcuticular extension being visible.

to occur after injudicious opening of such infections, particularly when a "drain" is left to lie across the sheath in the manner described by Iselin (1933). (See Figure VI.)

As was pointed out by Gordon (1951), it is not always easy to diagnose a tendon-sheath infection, and if some classical anatomical method of approach is used, a tendon sheath may well be opened when in fact the infection is superficial to it.

Palmar Space Abscesses.

Palmar space abscesses are collections of pus deep in the palm. Here again the abscess is surrounded by a barrier created by the tissues, and pus does not fill the individual space (in the manner described by Kanavel, Iselin and others). Therefore, classical incisions have no place and, as will be mentioned later, these abscesses are best opened where they are nearest the surface.

TREATMENT.

As was mentioned in the beginning of this paper, treatment is often inadequate, because once again, mainly owing to the influence of the teaching of Kanavel, early operation and standard incisions are practised. Another factor contributing to inadequate and misapplied operation is that almost all of the standard text-books continue to repeat the same old teaching of twenty or thirty years ago, and it is to these books that newly qualified house surgeons and indeed practitioners look when they are confronted with these problems. It is also true that teaching on the treatment of infections of the fingers and hand is in most cases given either badly or not at all, for these patients seldom

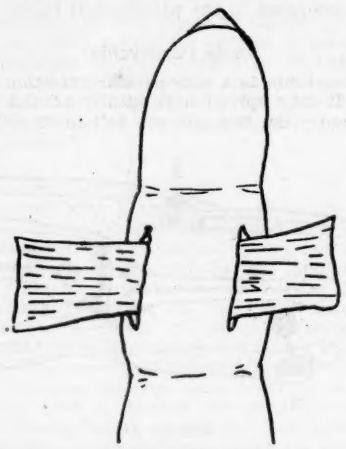

FIGURE VI.
Diagram showing commonly described method of drainage of a subcutaneous abscess over the middle phalanx. This method is wrong and dangerous.

reach the surgical wards of teaching hospitals, and few of those responsible for teaching ever treat them. The result is that teaching done on this subject tends to be a repetition of the "standard work" found in text-books long outmoded. This was forcibly impressed upon one of us recently when he was lecturing on this subject to a group of final year students, and the question was asked by a student: "Would it be safe to say this in the examination, or should I stick to the text-book descriptions?"

Principles Governing Treatment.

The principles governing treatment are as follows: (i) rest and elevation of the limb during the diffuse stage of infection; (ii) the use of antibiotics to help control the infection; (iii) surgical intervention only when pus has formed; (iv) the placing of incisions according to the localization of the infection and following no classical pattern; (v) the performance of all operations in a bloodless field; (vi) the performance of all operations under adequate anæsthesia.

Rest.

Rest is effected by splinting, and the part is elevated above the heart level both during the diffuse stage of infection and after operation.

Antibiotics.

The majority of these infections are caused by strains of the *Staphylococcus aureus*, which are penicillin-sensitive (over 90% in series described by Gordon, 1951),

and our practice is to give a long-acting form of penicillin once or twice daily, according to the severity of the infection. In addition to its systemic use, penicillin may be used locally as penicillin lactose powder (2000 units per gramme). This is used as a light dusting powder after the evacuation of pus, particularly when bare bone has been felt in the bottom of the cavity. Culture of the pus and testing of its sensitivity to the various antibiotics are reserved for those infections which fail to respond to the routine treatment outlined.

Operation.

No incision is made unless there is evidence of localized pus formation. The presence of this is often made obvious by a subcuticular bleb of pus (Figure V), or can be diagnosed by a point of localized tenderness as determined by testing with the closed points of a fine pair of forceps.

The instruments required are seen in Figure VII. It is essential that for this type of work fine instruments be used, for it is impossible to perform these operations

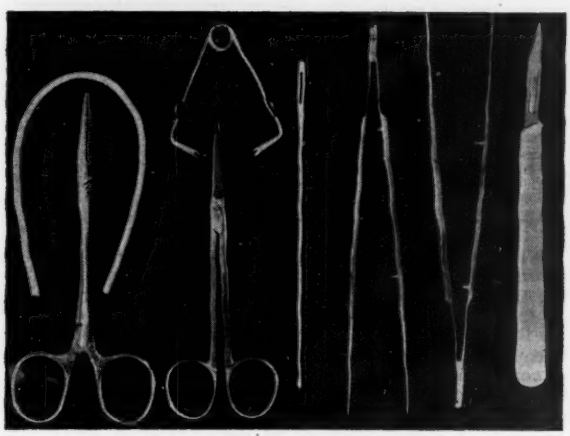

FIGURE VII.
Instruments used in treating infections of the fingers and hand.

adequately with the common tissue forceps and suture scissors.

The anæsthetic agent must give the patient good anæsthesia, and the surgeon abundant time for a careful operation. We have used local anæsthesia for these operations, and despite criticisms (Lowden, 1951), have not had any complications attributable to this method. It has the advantages of being convenient, satisfactory and readily used by any doctor working single-handed. General anæsthesia is quite satisfactory provided it is complete and of adequate duration. The short whiff of "gas", or "shot" of "Pentothal", and particularly the "freezing" with ethyl chloride, must once and for all be abandoned as unsuitable, dangerous and barbaric.

The method used is not original, nor is it new. It is the method used in the hand clinic at University College Hospital, London, at which clinic one of us has worked. It was described by Professor R. S. Pilcher in 1948 (Pilcher *et alii*, 1948).

The hand is elevated for one minute and a rubber tourniquet is applied to the base of the finger. A ring block is introduced, one cubic centimetre of 2% "Novocain" solution without adrenaline being used for each digital nerve.

In the case of infections at the base of the fingers or on the hand, the median, ulnar and radial nerves are blocked at the wrist, two cubic centimetres of 2% xylocaine solution, with adrenaline, being used in the region of the nerve, and to produce a bloodless field a sphygmomanometer cuff is applied to the arm as a tourniquet. It requires ten minutes' wait before anæsthesia is adequate.

Before operation the area is cleaned with antiseptic. We use "Zephiran" (one in 1000); subcuticular blisters are removed with fine scissors and a deep extension is sought and, if found, probed to determine its extent. The sinus leading to the subcutaneous cavity seldom suffices for drainage, and it is enlarged by incision to permit inspec-

FIGURE VIII.
Showing the operation for paronychia with removal of the part of the nail undermined by pus. (By permission of Glaxo Laboratories, Limited.)

tion of the walls of the abscess and its edges are cut away to form a small diamond-shaped opening. The pus is mopped out with pledgets of wool held in the fine tissue forceps. If there is no subcuticular pus, the abscess is opened where it is nearest the surface, the incision being

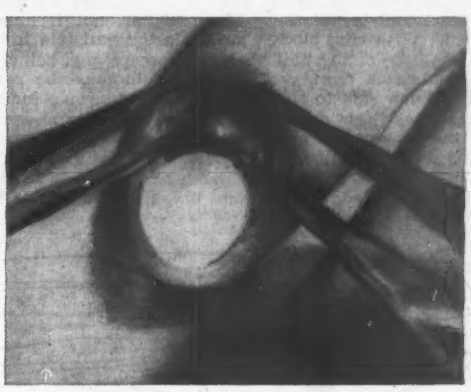

FIGURE IX.
The completed operation. (By permission of Glaxo Laboratories, Limited.)

made in the direction of Langer's lines. The cavity is explored and the incision enlarged and converted into a diamond-shaped opening, as was described above. No drainage tubes or gauze are ever left in the wounds, as these interfere with drainage and may cause complications. The wound is dusted lightly with penicillin lactose powder and a dressing of dry gauze is applied.

After Care.

The patient is instructed to keep the dressing dry. No foments or baths are permitted. He is examined the next day and the dressing is changed, because its absorptive

power is lost owing to venous oozing which soaks and stiffens the dressing. There is little pain on removal of the dressing after twenty-four hours, whereas if it is left longer it becomes firmly stuck. Subsequent dressings are carried out as indicated, and the patient is discharged when the hand is fully healed. Our criteria of healing are those described by Pilcher: "Complete epithelialisation without scabbing, the absence of local swelling and the return of full function of the hand. If the final functional result is likely to be short of normal, the patient is not discharged until further improvement is unlikely."

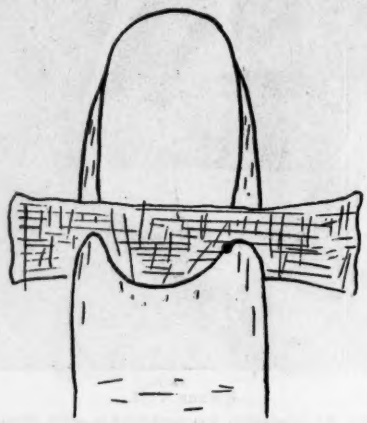

FIGURE X.
The standard bilateral incision illustrated in most text-books.

Special Application of Principles of Treatment.

Acute Paronychia.—The infection in acute paronychia is subcuticular, and subcutaneous extension is rare. If the patient is examined early, pus formation may be averted with rest and antibiotics. If pus is present it must be drained. With ring block anæsthesia the nail fold is freed from the base of the nail with fine forceps, pus being thus evacuated; this freeing of the nail fold must be carried out from one side to the other in all cases. No incisions are made, as these open subcutaneous tissue unnecessarily. Only the base of the nail or its lateral margin is resected if this is undermined with pus (Figure VIII). It is advisable to resect the whole width of the nail base, if any has to be resected, for a second operation may have to be performed if the part of the residual base dies, acting as a foreign body and causing continued discharge of pus and granuloma formation. Figure IX illustrates the completed operation.

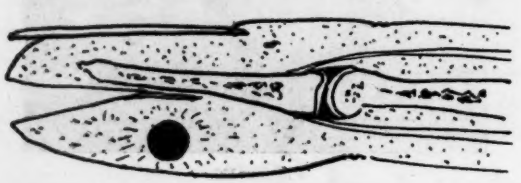

FIGURE XI.
The alligator incision usually advised. It may fail altogether to drain the abscess.

Standard text-books still continue to picture the method of bilateral incision (see Figure X), which is based on unsound pathology. It causes prolonged disability and often permanent deformity of the nail.

Pulp Abscess.—The infection in pulp abscess begins somewhere within the subcutaneous tissue of the pulp, and when the hand is examined early the whole pulp manifests the reaction to this infection, presenting as a tense throbbing pulp. The general principles outlined are followed, and when pus has formed the abscess is opened where it is nearest the surface; this may be at one side or directly over the centre. There is no place whatever for the classical alligator or hockey-stick incision, which is usually taught. These incisions are unduly damaging to the pulp and may spread infection to the phalanx or damage its blood supply. They may even fail to drain the pocket of pus in the pulp (Figure XI).

Apical Abscess.—In apical abscess general principles are again followed, and when the abscess is opened it is usually necessary to resect a V-wedge of nail and adjoining epidermis to secure drainage.

TABLE I.
Average Period of Disability.

Type of Infection.	Average Period of Disability. (Days.)	
	Saint Vincent's Hospital.	Bailey, 1952.
Acute paronychia	13·3	14·3
Pulp abscess	11·7	16·7
Apical abscess	10·2	11·0
Diffuse cellulitis	10·3	9·0
Web abscess	11·8	12·6
Subcuticular abscess	9·3	7·3
Subcutaneous abscess	14·2	14·5
Carbuncle	13·1	17·1

Web Infections.—Web infections are commonly seen before pus formation has occurred and are accompanied by gross œdema of the dorsum of the hand. General principles of treatment (rest, the use of antibiotics, elevation) are instituted. When localization has occurred the abscess is opened by a transverse incision where it points—that is, either at the base of the finger or opposite the interdigital cleft. The skin only is incised at first, the pus is mopped out with wool, and the cavity is explored with a probe.

TABLE II.
Average Delay of Patient in Presenting.

Type of Infection.	Average Delay in Presenting. (Days.)	
	Saint Vincent's Hospital.	Bailey, 1952.
Acute paronychia	5·2	5·3
Pulp abscess	4·7	5·5
Apical abscess	5·0	—
Diffuse cellulitis	3·9	—
Web abscess	2·8	—
Subcuticular abscess	4·0	—
Subcutaneous abscess	4·5	4·6
Carbuncle	4·6	5·0

The incision is then enlarged and deepened through the subcutaneous tissue to secure adequate drainage. Care is exercised to avoid damage to the nerves and vessels, which are displaced by the enlarging abscess. The wound edges are cut away as described.

Carbuncles.—Carbuncles are of the usual variety, and rest, elevation and the use of antibiotics are the basis of treatment. Surgical treatment is limited to the removal of overlying dead epidermis, which is easily done without pain. Slough is lifted out when it separates. The stellate incision extending as far as the borders of the area of induration, as advocated by Bunnell (1944) and others, is mentioned only to be condemned. It is entirely unnecessary, and in fact is likely to spread infection.

Tenosynovitis.—Tenosynovitis is fortunately rare in our experience, both at our own clinic and at University College

Hospital, but the treatment should follow the principles outlined, with conservatism in the early stages, and surgery when pus has formed. The subject has been fully dealt with in an excellent paper by Gordon (1952).

Space Infections.—Space infections, too, are relatively rare, and their treatment follows general principles outlined. The abscess does not fill the space as taught by Kanavel; thus there is no place for the routine use of "classical" incisions, the abscess being best drained where it is nearest the surface. We have followed this principle in the treatment of the only three patients with "space" infections seen at the clinic, with rapid healing and return to function.

Suppurative Arthritis.—Suppurative arthritis is the rarest of these conditions, and its management will not be considered here. An excellent account of its management has already been published (Riddell, 1950).

TABLE III.
Length of Treatment in Days.

Type of Infection.	Duration of Treatment (Days).			
	Early Presentation. (Less than Four Days.)		Late Presentation. (More than Four Days.)	
	Saint Vincent's Hospital.	Bailey, 1952.	Saint Vincent's Hospital.	Bailey, 1952.
Acute paronychia	8·5	8·4	8·1	9·8
Pulp abscess ..	6·8	10·2	8·0	18·0
Apical abscess ..	4·1	5·7	6·6	6·6
Web abscess ..	9·0	8·4	—	8·3
Cellulitis	6·4	5·5	6·8	8·5
Subcuticular abscess	8·4	4·0	6·7	3·7
Subcutaneous abscess	10·9	9·1	9·0	11·2
Carbuncle ..	8·3	10·4	9·9	13·1

ANALYSIS OF RESULTS.

This analysis is based on those patients who attended the clinic from the time of its inauguration in January, 1952, to January, 1953. The total number of new patients with infections of the fingers and hand examined at the clinic was 360. Some of these did not complete treatment, and 329 remain to be considered. The infections are classified as follows: acute paronychia 129 cases (39·2%), chronic paronychia 13 (4·0%), pulp abscess 29 (8·8%), apical abscess 9 (2·7%), web abscess 10 (3·0%), cellulitis 25 (7·6%), subcuticular abscess 25 (7·6%), subcutaneous abscess 56 (17·0%), carbuncle 25 (7·6%), miscellaneous infections 8 (2·4%).

The "miscellaneous group" was made up as follows: tenosynovitis three cases, "thenar space" infection two cases, "mid-palmar space" infection one case, suppurative arthritis one case, erysipeloid one case. These cases are not considered further in the analysis because their number is too few to be of value. It is worth mentioning, however, that the one patient with suppurative arthritis was sent to the clinic whilst awaiting admission to hospital for amputation of the finger.

His original condition was a crushing injury to the finger, which had been treated in the country for six weeks. When he was first examined at the clinic, the patient had a large, swollen, painful, stiff finger, with multiple sinuses and a disorganized terminal joint. The principles of conservative therapy—adequate drainage of the pus with removal of sequestra—were adopted, with such satisfactory progress that all thought of amputation was abandoned. He was eventually discharged from the clinic after nearly three months' treatment, his only disability being a stiff terminal joint.

The results of treatment are shown in Table I. The average duration of disability has been recorded and compared with that published by Bailey (1952). The results are much the same. The apparent improvement on the results of Bailey is probably because the series is much smaller than his.

The period of disability is made up of two parts: (*a*) the time from the onset of the disease until the first attendance at the clinic; (*b*) the time occupied by treatment. This is shown in Tables II and III, again compared with the figures of Bailey (1952).

It will be noted that the period of treatment has been subdivided into two groups—(*a*) that comprising early cases (patients presenting for treatment within four days of the onset of the disease) and (*b*) late cases (patients in whom the disease had been manifest for more than four days). There seems to be little difference in the two series; again this is probably due to the small number of cases in our own series.

SUMMARY.

1. The pathology underlying various infections of the hand is described and previous misconceptions are corrected.

2. A description of various infections is given.

3. The principles underlying rational treatment are outlined and a method of operation is described.

4. The application of this operation to various specific infections is given.

5. The results obtained in the clinic for infections of the fingers and hand at Saint Vincent's Hospital over a period of one year are given and analysed.

ACKNOWLEDGEMENTS.

Our thanks are due to Professor R. S. Pilcher, of University College Hospital, London, whose teaching forms the basis of this paper. We wish also to thank Sister Mary Regis, of the photographic department of Saint Vincent's Hospital, for the excellent photographs. Figures VIII and IX are reproduced with the permission of Glaxo Laboratories, Limited.

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CARDIAC ARREST AS A SURGICAL EMERGENCY.[1]

By IAN MONK,
The Royal North Shore Hospital of Sydney, Sydney.

RECENT advances in thoracic surgery have added greatly to a better understanding of the heart and its reaction to various stresses during anæsthesia and operation. Although our knowledge of the causes and the management of acute cardiac arrest is far from complete, yet every medical man, whether surgeon or anæsthetist, should make himself familiar with this problem.

It is apparent from a study of recent literature that all over the world many lives have been saved because a plan of action was put into effect promptly on recognition of the condition of acute circulatory arrest or so-called cardiac arrest.

[1] Read at a meeting of the honorary medical staff of the Royal North Shore Hospital of Sydney on June 11, 1953.

The purpose of this article is to state the fundamental facts as known at present, and to suggest a plan of action to be adopted in the face of this emergency.

The following statements are based on both operative and experimental experience.

The heart, unless seriously diseased, will tolerate a great deal of trauma, but it can stand anoxia for only short periods.

When anoxia exists, bradycardia, various irregularities of rhythm or tachycardia will ensue. Uncorrected anoxia ultimately will result in circulatory arrest, which may be due to ventricular fibrillation or cardiac standstill.

The result of cardiac standstill or ventricular fibrillation is the same—that is, cessation of the cerebral circulation.

If the cerebral circulation ceases for more than a few minutes, death or gross irreversible changes in the brain will result. The average time taken is about two to three minutes.

When acute circulatory arrest occurs, unless the heart can be seen or felt, it is impossible to distinguish cardiac standstill from ventricular fibrillation. Even an electrocardiogram may not give certain information once these complications have occurred, although continuous electrocardiographic readings during an operation in most cases will give information suggesting that such complications are about to occur.

An adequate circulation, sufficient to support life, can be maintained by intermittent intrathoracic cardiac compression. This is true only if the lungs are ventilated adequately with oxygen. One patient is reported as having survived cardiac arrest of one hour's duration, and periods of ten to twenty minutes are commonplace.

Experimentally, in dogs, the most effective rate of cardiac compression has been shown to be 120 per minute, but as this cannot be maintained for any length of time, a rate of 50 to 60 per minute is recommended and found to be effective in man.

Intrathoracic "massage" is four or five times more effective than intraabdominal transdiaphragmatic "massage". Life cannot be supported by intraabdominal manipulations, although sufficient stimulus may be given to the arrested heart to start it beating. Further, the distinction between true cardiac arrest and ventricular fibrillation cannot be made by palpation through the diaphragm.

In a review of the literature on reported cases of cardiac arrest, there appears to be one factor common to most cases, and that is anoxia.

In dogs, cardiac arrest can be produced regularly by lightly anæsthetizing them, rendering them slightly anoxic, and then performing some slight intratracheal manipulation. Such manipulations may consist of the passage of an intratracheal tube, the withdrawal of the tube, or an intratracheal aspiration. There is clinical evidence that a similar mechanism occurs in man, and it has been postulated that anoxia sensitizes a vasovagal reflex causing cardiac arrest.

By the use of an oximeter, which enables continuous readings of the arterial oxygen saturation to be made in the blood of the ear capillaries during operation, it has been shown that the manœuvre of passing a sucker down the intratracheal tube may result in a sudden drop of arterial oxygen saturation of up to 30%.

The two essential steps in treating the condition of acute circulatory arrest are as follows: (*a*) intermittent intrathoracic cardiac compression (so-called "massage"); (*b*) adequate ventilation of the lungs with oxygen. The objects of these two steps are to maintain an adequate oxygenated cerebral and coronary circulation and to overcome dilatation and cyanosis of the heart.

On the results of experimental and clinical experience, three drugs are used consistently in practice—adrenaline, procaine (or one of its derivatives) and calcium chloride.

Adrenaline is a very powerful myocardial stimulant. It is absolutely contraindicated if ventricular fibrillation is present, as it tends to perpetuate the condition, and it may induce ventricular fibrillation if given when the heart is dilated and cyanosed.

Procaine is a direct myocardial depressant. Over half a century ago cocaine was used to control experimentally induced ventricular fibrillation, and, as a result of these observations, procaine and its derivatives have been used extensively in recent years to control cardiac irregularities caused by surgical manipulations.

Calcium chloride is used as a myocardial stimulant, but there is not complete agreement as to its clinical efficacy.

No drugs of any kind should be injected into the circulation, or the heart, until effective cardiac "massage" and adequate ventilation of the lungs have been effected.

Experimentally, and clinically in a few cases, an intra-arterial transfusion of blood given at the crucial moment may save life by supplying a coronary and cerebral circulation starved of blood. In special cases it may be desirable to make provision for such a transfusion should the need arise, although such a procedure so far has not been universally favoured and is not without certain hazards.

Certain drugs have a direct action on the myocardium, such as chloroform, ethyl chloride and cyclopropane. The deleterious effects of these drugs are accentuated by oxygen lack and by adrenaline.

From the foregoing data certain points worthy of emphasis emerge. First, whatever the contributing causes may be, anoxia is usually the main, if not the sole, cause of sudden unexpected cardiac arrest. Second, the times of particular danger are during the induction of anæsthesia, and when the patient is recovering from the anæsthetic and a final intratracheal aspiration is being performed. Third, should acute circulatory arrest occur and appropriate measures be instituted within two minutes, the patient probably has better than a 50% chance of complete recovery. Fourth, the two essentials for recovery are (*a*) immediate intrathoracic cardiac "massage" and (*b*) immediate adequate ventilation of the lungs with oxygen. These two steps must precede any other measures, particularly the intracardiac injection of adrenaline.

Suggested Plan of Management.

Acute circulatory arrest should be recognized as having occurred when no radial or carotid pulse can be felt, and immediately the following steps should be taken.

The time is noted and, preferably, someone should be detailed to inform the surgeon and anæsthetist of each passing minute.

Immediately, and if the operation is not an intrathoracic procedure, the left pleural cavity is opened by a transverse incision commencing just lateral to the sternum along the line of, and down through, the fourth or fifth intercostal space. If necessary, adjacent costal cartilages can be divided with the scalpel. The heart is grasped in the right hand, with the thumb anterior, and rhythmic, firm, but not violent compressions of the heart are carried out about 50 to 60 times per minute.

At the same time adequate ventilation of the lungs must be effected. If an intratracheal tube is not already in place, it is preferable to insert one and connect this to the anæsthetic machine. Failing this, a tightly fitting anæsthetic face piece may be sufficient. Success has been recorded when mouth-to-mouth insufflation has been used.

No further treatment should be given for at least two or three minutes and in fact there is no need to hurry to the next steps.

Cardiac Arrest.

If the case is one of cardiac arrest, the following procedures should be carried out:

After two to three minutes inject intravenously 10 cubic centimetres of a solution containing one cubic centimetre of 1 in 1000 adrenaline in nine cubic centimetres of normal saline. Continue "massage" for another two or three minutes, and if standstill is still present repeat the injec-

tion of adrenaline. If after continued intermittent compression there is no response, it should be remembered that the foregoing measures have been known to maintain life for up to one hour with recovery, and that repeated doses of adrenaline, increasing up to five cubic centimetres of one in 1000 strength in a single dose, have been given with recovery.

Ventricular Fibrillation.

If the case is one of ventricular fibrillation, the following procedures are required:

After two or three minutes inject intravenously 10 cubic centimetres of 1% procaine solution. Continue "massage" for two or three minutes, and, if fibrillation persists, repeat the dose of procaine. If, after continued "massage", fibrillation is still present, it should be remembered that up to 50 cubic centimetres of 1% procaine solution can be given in a single dose to the average sized adult, that procaine is rapidly destroyed in the blood, and that procaine clinically and experimentally is successful in overcoming the condition. A completely satisfactory electrical defibrillator has yet to be perfected, and is not yet generally available. Finally, if cardiac arrest occurs during the course of some intrathoracic operation, more precise information can be obtained and a more efficient circulation maintained by widely opening the pericardium, and any drugs injected into the circulation are best injected into the left auricle.

Acknowledgements.

I should like to thank Dr. M. P. Susman, and Dr. F. H. Mills for their criticism and for several suggestions which have been incorporated in this article. I am indebted also to those members of the Honorary Medical Staff of the Royal North Shore Hospital of Sydney who contributed to the discussion following the presentation of this subject.

PORPHYRINURIA IN PERSONS EXPOSED TO LEAD HAZARDS.

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THE presence of coproporphyrin in the urine of persons suffering from numerous morbid conditions is not a recent finding.

Garrod (1892, 1893, 1894), who investigated 150 cases, showed that pigment belonging to the same group as hæmatoporphyrin occurred in minute amounts in the urine of normal people and in greater amounts in a number of pathological conditions.

Stokvis (1895) discussed the pathogenesis of hæmatoporphyrinuria.

Fischer and Duisberg (1932) showed that coproporphyrin III occurred in the urine of dogs poisoned by lead.

Van den Berg, Grotepass and Revers (1932) showed that lead, arsphenamine and mercury increased the protoporphyrin content of erythrocytes in parallel with the coproporphyrin in the urine.

Francke and Litzner (1935) showed that porphyrin excretion paralleled the degree of intoxication so exactly that they suggested determination of porphyrin excretion as a means of studying progress in plumbism. They stated that a daily excretion of 520γ or more of porphyrin in the urine was, with the exception of severe liver disease and acute porphyria, found only in lead poisoning. They found a daily excretion of 150γ in the urine of healthy lead workers.

Vigliani and Angeleri (1934, 1936) studied coproporphyrin excretion in four cases of lead poisoning, and the protoporphyrin content of the red cells. The coproporphyrin in twenty-four-hour specimens ranged from 1·0 milligramme to 2·58 milligrammes. The stippled cell counts ranged from 2500 to 4020 per 1,000,000 red cells. The urinary lead excretion was not determined.

Rimington and Schuster (1943) described a method of analysis of urine for coproporphyrin without the use of expensive apparatus.

Watson (1936) investigated three persons with lead poisoning who had anæmia (hæmoglobin value 67% to 69%) and considerable stippling of red cells. The excretion of the crystalline ester of coproporphyrin III ranged from 0·2 to 1·0 milligramme per day.

Apparently it is only in recent years that much attention has been given in English-speaking countries to the use of the porphyrin content of the urine in the diagnosis and prevention of lead poisoning.

Kench, Gillam and Lane (1942) investigated the blood lead and protoporphyrin contents, the urinary lead and coproporphyrin excretion, the percentage of hæmoglobin in the blood and the stippled cell count. They found the stippled cell count no indication of the amount of protoporphyrin in whole blood; the concentration of protoporphyrin in the blood was greater than that of coproporphyrin in the urine, but there was no constant relationship between the blood lead content and the urinary coproporphyrin excretion. They considered that the diminution of hæmoglobin value in lead poisoning was due not to non-utilization of protoporphyrin, but to restricted formation of this pigment.

De Langen and ten Berg (1948) showed that excretion of porphyrin in the urine increased before stippling of cells was detected.

Waldeman and Seiderman (1950) showed that all specimens of urine containing more than 0·15 milligramme of lead per litre gave positive reactions to tests for porphyrin. Thirty-four specimens containing less than 0·15 milligramme of lead per litre gave positive reactions to tests for porphyrin. One hundred and sixteen specimens were examined. These workers concluded that their semi-quantitative test was reliable as a screening test for lead absorption in places where a large number of workers were exposed to lead.

Maloof (1950), by plotting the mean coproporphyrin values for particular lead in urine values, showed that there was a fairly good correlation between the two. He found that the excretion of coproporphyrin in the urine was increased before there was abnormal amount of stippling of red cells, but the method of staining was not given.

In three cases of lead poisoning there was good correlation between the urinary lead excretion and the urinary porphyrin values. However, all the patients were given citrate treatment, which is known to increase lead excretion in the urine. Maloof considered that coproporphyrin values should carry more weight than the stippled cell counts, and pointed out the value of the porphyrin tests in distinguishing between the outcome in, for example, two cases, in both of which fairly high urinary lead values were obtained, but very different porphyrin values.

Albahary (1950) pointed out that observation of subjects with a long exposure to lead usually gives rise to contradictory results in relating stippling of cells and porphyrin excretion, the increase in the latter being less regular than is the increase in the stippled cell count. Porphyrin excretion can take place from the first contact of lead with the bone marrow, and even before the appearance of stippling.

Gaultier, Bruyet and Gardette (1950) could not establish a correlation between the severity of exposure (and its duration), the clinical symptoms, porphyrinuria, punctate basophilia and the lead content of the blood. In their study of men in a battery works an average of 2300γ of porphyrin was excreted, but only occasional stippled cells were seen, and the blood lead content was still normal (70 to 80γ per 100 cubic centimetres). Again, the details of staining were not given.

A. C. Brooks (1951) found that there was a definite trend to positive correlation between blood lead concen-

trations and urinary porphyrin concentrations for 100 men who had blood lead values ranging from 0·03 to 0·21 milligramme per 100 grammes of blood and porphyrin values ranging from 0 to 3·4+ (arbitrary values). He stated that porphyrin was found in the urine earlier than stippled cells in the blood, and that excessive porphyrin might be found in the urine long after cessation of exposure to lead and after disappearance of excessive lead from the blood; these observations suggest damage to the hæmatopoietic system that is not readily repaired.

Kench, Lane and Varley (1952) studied the urinary lead and coproporphyrin concentration in seven cases of lead poisoning. They showed that as well as coproporphyrin III there was an increase of coproporphyrin I at a mean of 30% of the total porphyrin excretion.

They found that after removal of the men from the hazard, and recovery, the coproporphyrin excretion reached normal values (0·1 milligramme per litre) in 133 days, and urinary lead excretion in fifty-five days (0·08 milligramme per litre). It is clear that there has been considerable divergence of opinion in regard to several aspects of coproporphyrinuria, notably its relation to basophilia stippling, to the presence of symptoms, and to the urinary and blood lead concentrations.

Present Investigations.

During the last two and a half years it has been the practice in this division to determine the coproporphyrin content of all specimens of urine examined for lead in an attempt to assess the value of this very rapid test as an aid in the prevention and diagnosis of lead poisoning.

This paper describes the results obtained from the examination of 279 specimens of urine from persons who had had various degrees of exposure. Some had just commenced work in a lead hazard, some had been exposed to lead hazards of various degrees of severity for long periods, some were actually suffering from lead poisoning.

In the earlier experiments, the porphyrin content of the urine was determined by extracting five cubic centimetres of the urine, acidified with two or three drops of glacial acetic acid, with five cubic centimetres of ether. The ether extract was then examined under ultra-violet light. The intensity of the fluorescence in a particular sample was estimated in arbitrary units by comparison with a sample with a fairly high porphyrin content. Later on (for about half the samples considered) the method was modified in the following way. The urine layer was run off and then five cubic centimetres of water were added to the ether and shaken. The aqueous phase was removed and five cubic centimetres of hydrochloric acid (2%) were added to extract the porphyrin from the ether. The porphyrin-containing acid solution was run off into a test tube and compared under ultra-violet light with a series of solutions containing known amounts of coproporphyrin, an orange filter being used to remove violet and blue visible light and any blue fluorescence which might still be present in the unknown. The standard solutions contained amounts ranging from 100 to 2000 microgrammes per litre, with increments of 100 microgrammes per litre for 100 to 1000. It was found that one of the previous arbitrary units corresponded to 150 microgrammes per litre.

The concentrations of lead in the urine were determined either by a modified Taylor (1929) method or by wet oxidation of 20 cubic centimetres and subsequent determination by the two-colour dithizone method. By determining the lead content by both methods in a considerable number of cases, it was shown that the two methods gave results which agreed closely.

The urine was collected in amber-coloured bottles and analysed for coproporphyrin as soon as possible after collection, in order to minimize the effect of light.

The results reviewed, unless the contrary is indicated, do not include those for urine from persons undergoing a treatment which either increased or decreased the urinary excretion of lead.

Relationship Between Urinary Lead and Coproporphyrin Concentrations.

In Table I the results of the 279 determinations are grouped so as to show the numbers of coproporphyrin values falling within certain ranges which correspond with different ranges of urinary lead values.

TABLE I.

Range of Coproporphyrin Values in Arbitrary Units.	Range of Urinary Lead Values in Milligrammes per Litre.																							
	0·00 to 0·05		0·06 to 0·10		0·11 to 0·15.		0·16 to 0·20.		0·21 to 0·25.		0·26 to 0·30.		0·31 to 0·35.		0·36 to 0·40.		0·41 to 0·45.		0·46 to 0·50.		0·51 to 0·55.		0·56 and Over.	
	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.	Number of Values.	Fraction of the Group.
0 to 2	30	1·0	28	0·76	35	0·71	18	0·38	8	0·29	3	0·115	3	0·27	1	0·05	1	0·08	2	0·33	1	0·20	0	0·00
2·1 to 4	0	0	4	0·11	3	0·06	8	0·17	2	0·07	6	0·230	1	0·09	1	0·05	1	0·08	0	0·00	0	0·00	1	0·13
4·1 to 6	0	0	4	0·11	4	0·08	11	0·23	5	0·18	5	0·19	1	0·09	4	0·20	0	0·00	0	0·00	2	0·40	1	0·13
6·1 to 8	0	0	1	0·28	1	0·02	7	0·15	4	0·14	3	0·115	2	0·18	3	0·15	2	0·17	1	0·17	0	0·00	2	0·26
8·1 to 10	0	0	0	0·0	3	0·06	2	0·04	3	0·11	3	0·115	1	0·09	2	0·10	2	0·17	1	0·17	0	0·00	1	0·13
10·1 to 12	0	0	0	0·0	1	0·02	0	0·00	4	0·14	2	0·077	1	0·09	3	0·15	1	0·08	1	0·17	1	0·20	1	0·13
12·1 to 14	0	0	0	0·0	1	0·02	1	0·02	0	0·0	1	0·038	0	0·0	2	0·10	2	0·17	0	0·00	0	0·00	0	0·00
14·1 to 16	0	0	0	0·0	0	0·00	0	0	2	0·07	0	0·00	0	0·0	2	0·10	2	0·17	1	0·17	1	0·20	1	0·13
16·1 to 18	0	0	0	0·0	1	0·02	0	0	0	0	2	0·077	0	0·0	0	0·00	0	0·00	0	0·00	0	0·00	0	0·00
18·1 to 20	0	0	0	0·0	0	0·00	0	0	0	0	1	0·038	1	0·09	0	0·00	1	0·08	0	0·00	0	0·00	0	0·00
20·1 and over	0	0	0	0·0	0	0·00	0	0	0	0	0	0	1	0·09	2	0·10	0	0·00	0	0·00	0	0·00	1	0·13
Totals	30	—	37	—	49	—	47	—	28	—	26	—	11	—	20	—	12	—	6	—	5	—	8	—

Table II shows the means of the individual values falling within the different ranges of urinary lead values and the means of the corresponding coproporphyrin values.

Figure I shows the curve obtained by plotting the mean urinary lead concentrations for certain ranges of values against the means of the corresponding urinary coproporphyrin concentrations for 248 pairs of observations—that is, up to mean values of 0·376 milligramme per litre and 11·57 arbitrary units respectively. There is an obviously close correlation between the two magnitudes up to the concentrations named. Above this concentration the coproporphyrin values are relatively less. This may have been due to the fact that the numbers of determinations at these higher values were much smaller. It may have been due to the formation of a compound of coproporphyrin and lead which contained relatively more lead per coproporphyrin molecule than in the other cases.

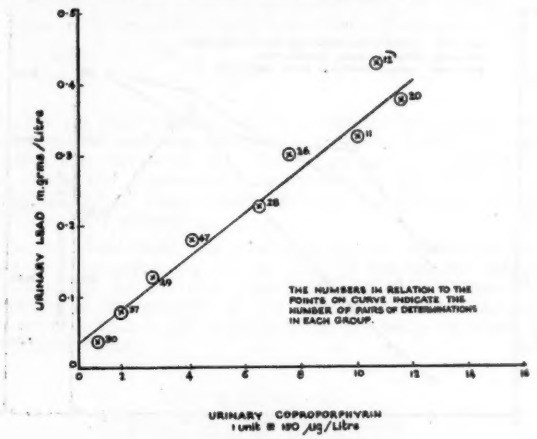

FIGURE I.

For the first eight groups of urinary lead values—that is, up to an average concentration of 0·376 milligramme per litre—the correlation coefficient between the urinary lead concentration and the urinary coproporphyrin concentration was 0·9759. This corresponds to a P value of $< 0·001$.

Relationship of Blood Lead Content and Urinary Coproporphyrin Content.

Table III shows the values of blood lead concentration and the corresponding urinary coproporphyrin concentration in a number of subjects, some of whom were suffering from lead poisoning.

The results in Table III are shown in Figure II.

For this set of values the correlation coefficient between blood lead and urinary coproporphyrin concentrations is 0·894, which for 11 pairs corresponds to a P value of $< 0·001$ ($n = 9$).

If, however, higher values than 0·20 milligramme per 100 grammes for blood lead concentration are included, the correlation is not nearly so good—namely, 0·54 for 14 pairs, corresponding to a P value between 0·05 and 0·02 ($n = 12$).

The blood lead concentrations were determined by wet oxidation with nitric acid. The solution obtained in this way was compared with a blank to which known amounts of lead were added. The blank solution was prepared by treating the same volumes of reagents as were used for the unknown in exactly the same way as in the case of the unknown. The comparison was by the two-colour dithizone method.

Relationship of Coproporphyrin Concentration in the Urine to Clinical Condition.

For the purpose of assessing the usefulness of the determination of the coproporphyrin concentration in the urine from the point of view of prevention and diagnosis of lead poisoning, a comparison has been made between the distribution of the coproporphyrin values in a group of persons who were suffering from lead poisoning at the time of the tests or very shortly after, and that in a group of unaffected persons who were exposed to lead hazards as evidenced by their occupations and by all having more than 0·08 milligramme of lead per litre of urine. The results are shown in Table IV.

TABLE II.[1]

Mean Values of Groups in Certain Ranges.

Range of Lead Values. (Milligramme per Litre.)	Mean Lead Value. (Milligramme per Litre.)	Mean Porphyrin Value. (Units per Litre.[2])
0·0 to 0·05 ..	0·037	0·07
0·06 to 0·10 ..	0·079	1·54
0·11 to 0·15 ..	0·127	2·71
0·16 to 0·20 ..	0·18	4·09
0·21 to 0·25 ..	0·228	6·47
0·26 to 0·30 ..	0·28	7·51
0·31 to 0·35 ..	0·327	10·02
0·36 to 0·40 ..	0·376	11·57
0·41 to 0·45 ..	0·43	10·7
0·46 to 0·50 ..	0·47	7·5
0·51 to 0·55 ..	0·53	7·6
0·56 to 0·60 and over	0·68	11·6

[1] The results in this table up to 0·376 urinary lead value and the corresponding porphyrin values are plotted in Figure I.

[2] One unit per litre = 150γ per litre.

In the "poisoned" group 0·59 of the number in the group had values above eight units (that is, 1200γ per litre), whereas in the non-poisoned group only 0·06 of the number in this group had values above this. Of the 22 values for coproporphyrin greater than eight units (that is, 1200γ per litre), 16 were for persons who were either lead-poisoned or became so within a few days of the tests (that is, 0·73 of this group). Sixty-eight persons were concerned in this particular analysis.

TABLE III.[1]

Blood Lead Content. (Milligramme per 100 grammes.)	Coproporphyrin in Urine. (1 unit = 150γ per Litre.)
0·03	0
0·03	0
0·07	0
0·07	2
0·08	1
0·11	10
0·13	12
0·14	8
0·15	10
0·17	13
0·17	15

[1] The results in Table III are shown in Figure II.

Relationship Between Basophilic Stippling and Urinary Coproporphyrin Content.

The significance of the basophilic stippling in lead absorption has long been recognized and the determination of the number of stippled cells per million red cells is undoubtedly of value from the point of view of routine control in lead exposure and as an aid to diagnosis.

It has, however, some disadvantages. Not all cases of lead poisoning, even in the acute phase when there is considerable circulating lead, show any marked evidence of stippling.

Further, the stippled count depends to a considerable extent on the observer and on the technique of making the film and staining and counting it. This point, though of little importance if the same technique is followed in one particular laboratory, is of importance when comparison is made of the results of different observers using different methods.

The method of determining the stippled cell counts was as follows.

Thin films were dried in air, fixed for three minutes in acetone-free methyl alcohol, and stained with Seller's stain (methylene blue one gramme, sodium bicarbonate six grammes, distilled water 200 cubic centimetres) for forty-five seconds and washed with tap water until a pale green colour.

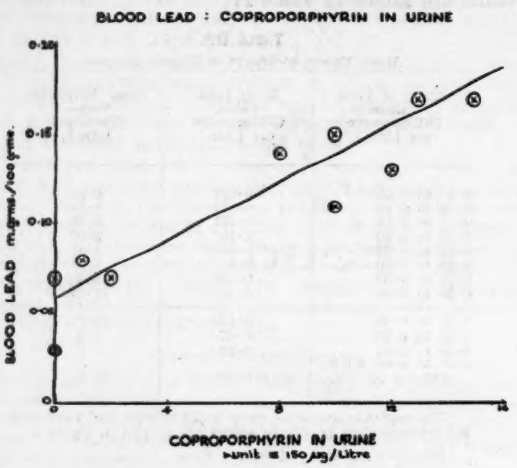

FIGURE II.

The count was made by using an oil immersion lens (× 60), compensating × 10 oculars, and prism mounting × 1·5, which gave a total magnification of 900. The total number of cells in a field was estimated by counting the number (n) across a diameter and taking $11/14\ n^2$. Twenty-five fields were examined, the number of stippled cells in each being counted. Counting was confined to fields in which the films were one cell thick, and the cells were regularly distributed.

TABLE IV.

Range of Values of Coproporphyrin. (1 unit = 150γ per Litre.)	Group I. Lead Poisoned at Date of Test or Within a Few Days Later.		Group II. Not Poisoned but with Urinary Lead Concentration 0·08 Milligramme per Litre or Over.	
	Number.	Fraction of the Group.	Number.	Fraction of the Group.
0 to 2 ..	1	0·037	49	0·56
2·1 to 4 ..	2	0·074	12	0·14
4·1 to 6 ..	4	0·148	14	0·16
6·1 to 8 ..	4	0·148	7	0·08
8·1 to 10 ..	4	0·148	3	0·03
10·1 to 12 ..	4	0·148	3	0·03
12·1 to 14 ..	0	0·000	0	0·00
14·1 to 16 ..	5	0·185 (0·592)	0	0·00 (0·06)
16·1 to 18 ..	0	0·000	0	0·00
18·1 to 20 ..	0	0·000	0	0·00
20·1 and over	3	0·111	0	0·00
Totals ..	27	—	88	—
Average value of porphyrin	11·08 units = 1662γ per litre		2·85 units = 428γ per litre.	

In the case of the determination of the porphyrin content of the urine by trained chemists the results may be expected to show less variation from one laboratory to another.

The relationship between the number of stippled cells and concentration of coproporphyrin in the blood or urine is of interest from several points of view. If there should prove to be a very close correlation between the two in the majority of cases, it might be satisfactory to abandon the stippled counts in favour of the other test.

Apart from this clinical application of the test, any relationship would be of interest from the hæmatological and biochemical points of view.

This investigation has shown that in the early stages of exposure there is a fairly close relationship between the stippled cell counts and the concentration of porphyrin in the urine. This is well shown in Figure III, in which are plotted the mean values at weekly intervals of the stippled cell counts, urinary lead concentrations and urinary porphyrin concentrations of ten men from commencement of employment in a white lead factory. None of these men had previously been employed in any occupation involving a lead hazard.

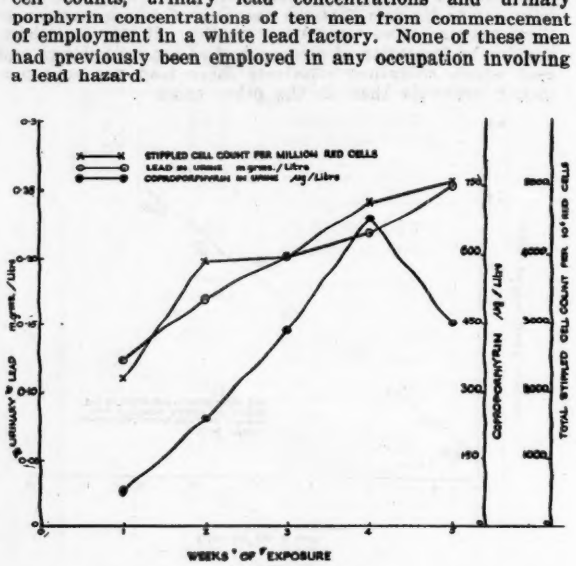
STIPPLED CELL COUNT PER MILLION RED CELLS
LEAD IN URINE mgrms./Litre
COPROPORPHYRIN IN URINE µg/Litre
URINARY Pb LEAD mgrms./Litre
COPROPORPHYRIN µg/Litre
TOTAL STIPPLED CELL COUNT PER 10⁶ RED CELLS
WEEKS OF EXPOSURE

FIGURE III.

This figure shows a parallel increase in all the values from the first to the fourth week, and to the fifth week for the urinary lead concentration and stippled counts.

Table V shows the distribution of the total stippled counts for increasing ranges of values of the corresponding urinary coproporphyrin concentration for 240 determinations of each.

The reason for the difference in the numbers considered here (240) and the 279 considered in relation to coproporphyrin and lead in urine is that in some of the latter cases stippled counts were not available. No special selection was made where both stippled cell counts and coproporphyrin in urine values were available.

Inspection of Table V shows a very pronounced tendency for the higher porphyrin values to be associated with the higher stippled cell counts. Table VI illustrates this.

The mean values for the stippled counts and the corresponding mean values of the urinary coproporphyrin content up to the range 6·1 to 8·0 of the latter are shown in Table VII.

The correlation coefficient for these six pairs ($n = 4$) of mean values was 0·967, corresponding to a P value of about 0·0025.

Urinary Coproporphyrin and Anæmia.

No relationship has been found between the urinary coproporphyrin concentration and the hæmoglobin deficit in the blood in cases of lead poisoning.

Discussion.

One point of interest is that, if we take the mean values in the groups, the relative weights of lead and coproporphyrin in the urine up to urinary lead values of 0·38 milligramme per litre are almost in the same ratio as the

TABLE V.

Urinary Porphyrin Content. (1 unit = 150γ per Litre.)	Stippled Cell Counts.															
	0 to 4000	Fraction of the Class.	4001 to 8000	Fraction of the Class.	8000 to 12000	Fraction of the Class.	12001 to 16000	Fraction of the Class.	16001 to 20000	Fraction of the Class.	20001 to 24000	Fraction of the Class.	24001 to 28000	Fraction of the Class.	28000 and Over.	Fraction of the Class.
0 to 0·50 ..	38	0·593	13	0·176	1	0·0256	1	0·0435	1	0·0715	0	0·000	0	0·000	0	—
0·60 to 1·0 ..	7	0·109	7	0·093	2	0·0512	0	0·000	2	0·1430	0	0·000	0	0·000	0	—
1·1 to 2·0 ..	8	0·125	7	0·093	3	0·0768	0	0·000	0	0·000	0	0·000	1	0·125	0	—
2·1 to 4·0 ..	5	0·078	16	0·213	4	0·1024	2	0·0870	2	0·1430	1	0·077	0	0·000	2	0·50
4·1 to 6·0 ..	4	0·063	14	0·187	9	0·2304	8	0·3480	2	0·1430	3	0·231	1	0·025	0	—
6·1 to 8·0 ..	1	0·016	5	0·066	5	0·1280	1	0·0435	2	0·1430	3	0·231	3	0·375	1	0·25
8·1 to 10·0 ..	1	0·016	3	0·04	1	0·0256	3	0·1305	2	0·1430	3	0·231	1	0·125	1	0·25
10·1 to 12·0 ..	0	0·000	7	0·093	7	0·179	3	0·1305	0	0·000	0	0·000	0	0·00	0	—
12·1 to 14·0 ..	0	0·000	2	0·027	1	0·0256	1	0·0435	0	0·000	0	0·000	0	0·00	0	—
14·1 to 16·0 ..	0	0·000	1	0·013	3	0·0768	1	0·0435	2	0·1430	2	0·154	0	0·00	0	—
16·1 to 18·0 ..	0	0·000	0	0·000	0	0·000	1	0·0435	0	0·000	0	0·00	0	0·00	0	—
18·1 to 20·0 ..	0	0·000	0	0·000	1	0·0256	0	0·000	0	0·000	0	0·00	1	0·125	0	—
20·1 and over ..	0	0·000	0	0·000	2	0·0512	2	0·0870	1	0·0715	1	0·077	1	0·125	0	—
Totals ..	64	—	75	—	39	—	23	—	14	—	13	—	8	—	4	—

weights for lead coproporphyrin compound containing one lead atom for each coproporphyrin molecule, namely 1:3·25 (theoretical value, 1:3·15). For larger amounts of lead in the urine the coproporphyrin values are relatively less. Possibly lead in these circumstances is entering one of the four carboxyl groups.

On the other hand, the alteration in the relationship of lead to coproporphyrin in the case of the higher values may be due to the fact that in the more concentrated solutions of coproporphyrin the amount of fluorescence is not proportional to the concentration but tends to reach a maximum value.

TABLE VI.

Fraction of the Groups Showing Stippled Cell Counts Greater than 8000 per Million Red Cells.

Porphyrin Values.	Fraction of the Group.
0 to 0·50 ..	0·05
0·60 to 2·0 ..	0·21
2·1 to 4·0 ..	0·30
4·1 to 6·0 ..	0·58
6·1 to 10·0 ..	0·71
10·1 and over ..	0·73

In regard to the relationship between stippling and coproporphyrin excretion there is the possibility that the stipples in basophilic stippling of the erythrocytes consist of protoporphyrin or of a compound of lead and protoporphyrin. An approximate calculation based on the following reasonable assumptions indicates that the weight of substance in the stipples is ample to supply the amount of coproporphyrin excreted in the urine. A group having an average stippled count of 13,000 per million red cells showed 1·1 milligrammes of coproporphyrin per litre of urine. If we assume 10 to 60 stipples per stippled cell and each stipple 0·35μ in diameter and of density one, the total weight of stipples in the blood would be 70 to 417 milligrammes. If we assume 1·5 litres of urine per day, the weight of coproporphyrin excreted per day in the urine would be 1·1 milligrammes.

This theory would require the conversion of some of the protoporphyrin to coproporphyrin before excretion in the urine. Van den Berg *et alii* (1932) showed that lead increased the protoporphyrin content of the red cells in parallel with the coproporphyrin in the urine. Lemberg and Legge (1949), after discussion of this point, state that the question as to whether protoporphyrin in the red cells can be converted to coproporphyrin must be left open. It may be excreted as such, converted to coproporphyrin or destroyed.

From the point of view of routine control of employees exposed to lead hazards, the determination of the urinary coproporphyrin content has certain advantages over other tests, especially when a large number of persons are concerned. The test can be performed in about ten minutes, whereas urinary lead determinations may take several hours. Although a stippled cell count of sufficient significance can be carried out in about ten minutes for the actual count, the performance of a large number of these is tedious, and the preparation of slides, making of films, fixing and staining, washing and drying consume considerable time. One advantage of the stippled cell count is

TABLE VII.

Number of Pairs of Values.	Urinary Porphyrin Content. (1 unit = 150 γ per Litre.)		Mean Value of Total Stippled Cells per 10^6 Red Cells.
	Range.	Mean.	
54	0 to 0·50	0·03	3540
18	0·60 to 1·0	0·95	6640
19	1·1 to 2·0	1·93	6400
30	2·1 to 4·0	3·61	7180
43	4·1 to 6·0	5·47	11,190
20	6·1 to 8·0	7·36	13,040

that the film provides a more or less permanent record, which may be examined or produced many months after being made. Whereas urine may be accidentally or purposely contaminated with lead, the occurrence of accidental contamination with porphyrin may be ruled out, and the purposeful contamination with the appropriate quantity is possible only to a very skilled person.

The determination of coproporphyrin in urine is also of value in helping to decide on the question of possible contamination with lead. In a case in point a high urinary lead value was obtained (0·6 milligramme per litre) in a sample of urine sent in for analysis. The coproporphyrin result was also high (0·7 milligramme per litre), indicating that the patient had certainly had considerable absorption of lead, and that the sample was probably not contaminated with lead.

Certain disadvantages are that the porphyrin in the urine is not stable under the influence of light and other influences, and hence the determination must be carried out shortly after the urine has been collected and on samples which have been kept in amber-coloured bottles and/or in the dark.

The chemical determination of the lead in urine does not depend on the age of the sample, but it requires considerable skill, and is the sort of test in which reliable results can be obtained only by a competent chemist.

The concentrations of coproporphyrin in the urine are not quite so closely related to the clinical conditions as are the stippled cell counts, the coefficients of variation in the values in a group of 27 lead-poisoned persons being for the stippled cell counts 41%, and for the coproporphyrin value in urine 61·16%.

Generally, it has been found in the case of lead-poisoned persons that on cessation of exposure and/or treatment the stippled cell count returns to normal rather sooner than the coproporphyrin value in urine. According to Kench *et alii* (1952) the stippled cell counts return to normal very much sooner than the coproporphyrin value. We have not found such a long interval as Lane records.

In some cases, however, there was a very marked, though temporary, increase in the coproporphyrin excretion as recovery took place.

If the coproporphyrin in the urine in lead-poisoning cases is derived from the stippling, it is to be expected that as the stippling decreases the coproporphyrin in the urine will be increased, or maintained at higher than normal levels for a longer period than is the stippling, owing to the time required to destroy or excrete it.

Various observers have pointed out that abnormal amounts of coproporphyrin in the urine indicate damage to the organism, whereas abnormal amounts of lead do not. This distinction, though valid, is not quite of so much importance as it may appear to be at first sight, since experience with over two thousand analyses for lead in urine has indicated definitely that abnormally high values are in the great majority of cases associated with signs and symptoms which indicate damage to the organism.

Summary.

The results of 279 determinations of lead and coproporphyrin in urine, and of 240 stippled cell counts have been considered.

Consideration of the means of increasing ranges of values of lead in urine and the means of the corresponding coproporphyrin values shows a close correlation between the two up to mean values of 0·376 milligramme per litre and 1·74 milligrammes per litre respectively.

Similar though not so close correlation exists in regard to the total stippled cell counts and the coproporphyrin in urine up to mean values of 13,000 stippled cells per million red cells and 1·1 milligrammes of coproporphyrin per litre of urine.

There is a fairly close correlation between blood lead values and coproporphyrin in urine values up to 0·17 milligramme per 100 cubic centimetres of blood and 2·25 milligrammes per litre of urine.

The determination of the concentration of coproporphyrin in urine is considered to be very useful in the control of lead exposure and prevention of lead poisoning, and as an aid in diagnosis.

Certain advantages of this test have been pointed out.

As an aid to diagnosis in doubtful cases, it is not considered advisable to abandon stippled cell counts and/or lead in urine or blood determinations, but to do all three and in addition to determine the ratio of monocytes *plus* large lymphocytes to small lymphocytes.

Acknowledgements.

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THYROIDECTOMY FOLLOW-UP.

By OSWALD B. TOFLER, M.B., B.S.,
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IN the casualty department at the Royal Newcastle Hospital I saw several patients who had failed to derive benefit from thyroidectomy in this and other centres. Some had gained excessively in weight, others complained of recurrence of a goitre. Their stories prompted me to assess the results of thyroidectomy at this hospital. This has been done, first by an analysis of the hospital records and secondly by follow-up.

During the years from 1940 to 1948, 251 operations were performed on the thyroid gland at the Royal Newcastle Hospital by various surgeons. Five patients died within the first twenty-four hours, a mortality rate of 2%.

The types of operations performed can be seen in Table I.

Histopathological examination was made in every case. In no case was a diagnosis of carcinoma or thyroiditis confirmed by histological examination.

Follow-up.

Of those who had undergone thyroid operations, 171 were interviewed. An attempt was made to assess whether each person's condition was much better, perhaps a little better, the same, or worse after operation. On the basis of the reason for which operation was performed, the patients fell into the following four groups:

1. The toxic group. This consisted of cases in which the diagnosis of thyrotoxicosis was the reason for operation.

2. The mechanical group. This consisted of cases in which the indication for surgery was the relief of such symptoms as those described in the following terms: "I can't lie down flat at night." "I feel as if I am smothering

at times." "I have choking feelings, becoming much worse lately." "I can't get the air in properly, especially when I am excited." "I am very short of breath."

TABLE I.

Operation.	Number of Cases.
Subtotal thyroidectomy	169
Hemithyroidectomy	22
Partial thyroidectomy	22
Removal of adenoma	23
Total thyroidectomy	7
Excision of hæmorrhagic cysts	3
Excision of ordinary cysts	3
Excision of thyroglossal cysts	1
Excision of hydatid cyst	1
Total	251

3. The thyroid swelling group. This was further divided into two subgroups, as follows: (*a*) The removal of the swelling was advised by the doctor: "You had better have that goitre out before it comes against you." (*b*) The removal of the thyroid swelling was requested by the patient for cosmetic reasons.

TABLE II.

Group.	Number of Patients.	Condition Much Better.	Condition Perhaps a Little Better.	Condition the Same.	Condition Worse.
1 (*a*) Thyrotoxicosis	44	31	8	5	—
1 (*b*) Possibly not thyrotoxicosis	65	16	21	24	4

4. Others.

TABLE III.

Group.	Number of Patients.	Condition Much Better.	Condition Perhaps a Little Better.	Condition the Same.	Condition Worse.
Mechanical	26	11	5	6	4

Group 1: Thyrotoxicosis.

Means makes the following statement: "The diagnosis of classical Graves's disease is one of the easiest in all medicine to make. It is only in the atypical cases that we are pushed at all in the matter of diagnosis."

As the Hunter River valley has the reputation of being an area of endemic goitre, it is not surprising that in Newcastle there would be seen patients with a thyroid swelling in association with an anxiety state or neurocirculatory asthenia. In such patients, even the most experienced clinician finds difficulty in differentiating between the "toxic" and the "non-toxic", if indeed such a difference exists.

TABLE IV.

Group.	Number of Patients.	Condition Much Better.	Condition Perhaps a Little Better.	Condition the Same.	Condition Worse.
Thyroid swelling	24	7	1	12	4

If we bear the foregoing statement of Means in mind and use the evidence of the patient's story and the hospital records, the group labelled "toxic" fell into two divisions: (*a*) undoubted thyrotoxicosis; (*b*) possibly not thyrotoxicosis—that is, an anxiety state could not be excluded.

The results are summarized in Table II.

TABLE V.

Group.	Number of Patients.	Condition Much Better.	Condition Perhaps a Little Better.	Condition the Same.	Condition Worse.
Cosmetic	9	7	1	1	—

It will be noticed that 31 out of 44 patients were much better in group 1 (*a*), whereas only 16 were much improved out of 65 in group 1 (*b*). Only five failed to derive benefit from operation in group 1 (*a*), whereas in group 1 (*b*) there were 28 patients who derived no benefit. The four members of group 1 (*b*) whose condition was worse after operation were so classified because in addition to their original symptoms and signs they had either gained excessively in weight or lost their voice.

TABLE VI.

Total Number of Patients.	Condition Much Better.	Condition Perhaps a Little Better.	Condition the Same.	Condition Worse.
171	73	37	49	12

Group 2: Mechanical.

The results are summarized in Table III.

It will be seen that only 11 out of 26 had good results, and four were worse after operation.

Group 3 (a): *Thyroid Swelling.*

Table IV shows the results in group 3 (*a*), those whose doctors advised removal of the thyroid swelling.

TABLE VII.

Group.	Number of Patients.	Tracheotomy Performed.	Cords Paralysed.	Voice Changes.	Thyroid Deficiency.	Recurrence of Swelling.	Multiple Operations.
1 (*a*). Thyrotoxicosis	44	1	4	17	20	5	7
1 (*b*). Possibly not thyrotoxicosis	65	4	10	21	16	24	9
2. Mechanical	26	1	2	7	6	8	3
3 (*a*). Thyroid swelling	24	—	2	6	5	5	—
3 (*b*). Cosmetic	9	—	1	4	1	2	1
4. Others	3	—	—	—	—	—	—
Totals	171	6	19	55	48	44	20

It can be seen that 16 out of 24 failed to derive benefit from the operation, and four were worse for the operation.

Group 3 (b): Cosmetic.

Table V summarizes the results in cases in which the swelling was removed for cosmetic reasons. Unfortunately the number in this group is very small.

There were three cases not classified. In the first a successful removal of a hydatid cyst was performed, in the second a hæmorrhagic cyst was removed, and in the third thyroidectomy followed a traumatic incident.

All Groups.

The results of all these groups are summarized in Table VI.

The complications of these operations are set out in Table VII.

Tracheotomy.—Six patients underwent tracheotomy—two during the thyroid operation, one immediately after, one five weeks after, one six months after, and one during childbirth eight years after the operation. King's operation has been performed on three of these six patients.

Table VIII.

Signs and Symptoms.	Number of Cases.
Dry hair	17
Gain of more than three stone in weight in excess of normal weight	17
Dependence on thyroid tablets	10
Excessive lack of energy	4
Inability to keep warm	3

Voice Disability.—Fifty-five people complained of some voice symptoms, ranging from continual hoarseness to inability to sing or to call out loudly. To date 40 of these people have been examined. A paralysed vocal cord has been seen in each of 19 cases. The cord in each case was in the cadaveric position. In each case except one the side on which the cord was seen to be paralysed corresponded with the side on which the surgeon had attempted total removal of the gland. In the remaining 21 cases no local causes could be found.

Table IX.

Type of Swelling.	Number of Cases.
Diffuse	14
One lobe	14
Pyramidal lobe	16

It may be pointed out that one or two surgeons who performed a great percentage of the operations have been credited with very few cases of cord paralysis.

Thyroid Deficiency.—Signs and symptoms of thyroid deficiency in this series are represented in Table VIII.

Parathyroid Deficiency.—Two people have a typical parathyroid deficiency syndrome.

Recurrent Swelling.—There were 44 people with obvious thyroid swellings after their surgical procedure. The situation of these recurrent swellings was as shown in Table IX.

Eyes.—The exophthalmos in two cases was worse following operation. One man required a plastic operation on his lids. Familial exophthalmos was seen in four people.

Other Complications.—Other complications are shown in Table X.

Dramatic Personality Changes.—There were at least three people whose personality changed remarkably for the better after thyroidectomy. For example, one woman whose reaction to the sight of a person crying was to burst into tears herself, found that after her operation her reaction to a similar situation was "what is that fool sniffling at?".

Table X.

Type of Complication.	Number of Cases.
Unilateral Horner's syndrome	1
Axillary vein thrombosis with impaired function of the right hand	1
Adherent scar	4

Conclusion.

1. A four to ten year thyroidectomy follow-up shows that there was a greater percentage of successes among patients with obvious thyrotoxicosis than among those whose diagnosis was a little in doubt.

2. Thyroidectomy performed for reasons other than toxicity—for example, thyroid swelling, cosmetic reasons or mechanical reasons—produced indifferent results.

3. The complications of thyroid surgery in this series are much more common than one might expect.

Acknowledgements.

My thanks are due to the Records Department for invaluable assistance; to the Almoner Department for helping to locate the patients; to Dr. A. B. K. Watkins and Dr. R. Lindsay for performing laryngoscopic examinations; and to the honorary and resident medical staff for their criticism and suggestions.

Reports of Cases.

TRAUMATIC ANTERIOR DISLOCATION OF THE HEAD OF THE RADIUS: REPORT OF A CASE.

By Gordon Kerridge,
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Traumatic dislocation of the head of the radius unaccompanied by other injuries is a very rare lesion—in fact, so rare as to have been described by Watson-Jones as practically unknown. The very small number of cases that have been reported makes this further case worthy of record.

Clinical Record.

J.S., a female child, aged four years, was examined at the fracture clinic of the Royal Newcastle Hospital on December 27, 1952. Seven weeks before, she had sustained an injury to the right elbow. This appeared, from the history, to have been a hyperextension injury received when the child was involved in a fall from a swing. After this incident the elbow was very painful and swollen, and the child was taken to a hospital casualty department, where a radiological examination was pronounced as revealing no abnormality. The swelling and pain gradually settled down, but movement did not improve, and the mother noticed that there was considerable instability in the elbow.

Clinical examination revealed gross limitation of elbow movements. The range of flexion and extension proved to be from 80° to 140°, whilst there was less than half the normal range of supination and pronation. On palpation, the head of the radius could be felt in the cubital fossa. There was considerable lateral instability. Radiological examination confirmed the diagnosis of anterior dislocation of the head of the radius. There was no evidence of fracture in the whole length of the shaft of the ulna. Radiological examination of the normal elbow revealed no abnormality.

On January 15, 1953, operation was performed. A postero-lateral incision was made, and it was found that there had been a rupture of the orbicular ligament. A hole was drilled in the upper end of the ulna and a strip of *fascia lata* was threaded through this drill-hole. The *fascia lata* was then passed around the neck of the radius in figure-of-eight fashion after reduction of the anterior dislocation, in

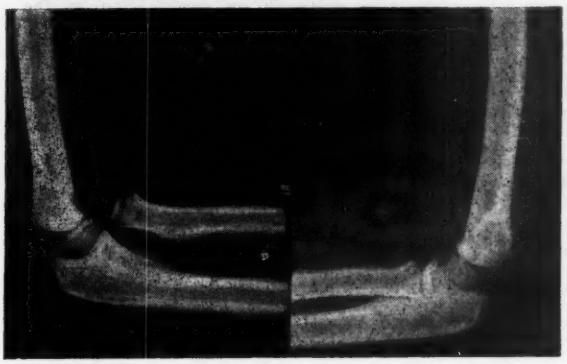

FIGURE I.

X-ray pictures of both elbows, showing anterior dislocation of the head of the right radius.

order to form a new orbicular ligament. At the completion of operation, the arm appeared quite stable. Immobilization in flexion in a plaster of Paris back slab was maintained for three weeks, and active movements were then

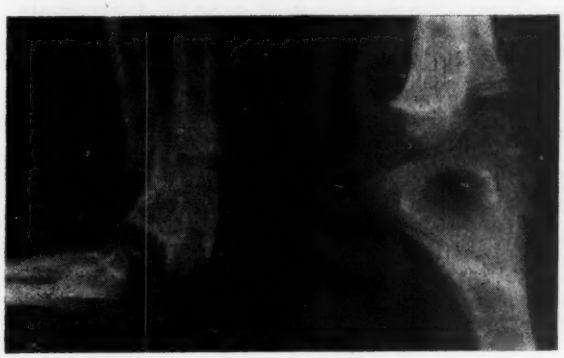

FIGURE II.

X-ray picture of right elbow three months after operation, showing that reduction has been maintained.

commenced. The child, when last examined two weeks ago, had a completely normal and painless range of movements. Radiological examination reveals that reduction of the dislocation has been maintained.

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British Pharmacopœia 1953. Published under the direction of the General Medical Council, pursuant to the Medical Council Act, 1862, and the Medical Act, 1950; 1953. London: Published for the General Medical Council by The Pharmaceutical Press. 9″ × 6″, pp. 918. Price: 50s.

A FIRST impression of the eighth edition of the British Pharmacopœia 1953 gives the pleasure of a handsome volume solidly bound and excellently printed. A glance at the monographs, however, reveals a most outstanding but welcome violation of precedent, in that Latin titles have been abandoned in favour of English ones. True, the erstwhile Latin names are retained as synonyms or as subsidiary titles, but none have been coined for new drugs, and the myth of Latin as the universal language of the prescribing art is officially exploded.

It might be thought that such a change would increase the difficulty of finding one's way through the volume without constant reference to the index, but after a little use it proves to be easier than in previous editions in that the actual drugs are placed in strictly alphabetical order and each is followed by monographs dealing with the several preparations into which it may enter. While such a convenient arrangement upsets the immediate alphabetical sequence of the monographs and is at first confusing, alphabetical continuity, so far as it concerns the actual drugs, is effected by an appropriate heading on each right-hand page.

While it is obviously impossible in such a review as this to deal with all the changes introduced, it will be observed that in the very numerous deletions, sentimental attachments to useless drugs and concessions to mediævalism are in the discard. In fact, many drugs of quite recent inclusion have been dropped for more useful homologues or equivalents. In this class are such drugs as dicoumarol, hexœstrol, œstradiol dipropionate, œstrone, thiouracil, sulphacetamide and the mandelates.

As a natural corollary to their therapeutic recognition and to the ready synthesis or isolation of many alkaloids and other plant principles, several crude drugs have been retired in favour of their active constituents. Such include ergot and strophanthus.

Big guns among the purgatives have been spiked by the exclusion of colocynth and its compound extract, ipomœa and its resin, podophyllum and Indian podophyllum, pills of mercury, aloes, rhubarb, and even that "Big Bertha" of polypharmacy, the black draught.

While squills with its syrup, oxymel and tincture will hardly be missed, for the prescription of these has been for many years an article of faith rather than of therapeutic conviction, we are, in some respects, sorry to note that diamorphine has been relegated to the outer darkness of non-endorsement.

There has been a heavy mortality among many classes of galenicals. Infusions are now confined to those involving quassia and gentian. The suppositories are reduced to two—those of glycerin and of hamamelis. Lozenges have a solitary representative in those of penicillin, while pills have disappeared entirely in favour of tablets. On the other hand two new groups of medicaments in dosage form make their official debut—implants (deoxycortone and testosterone) and capsules (chloramphenicol, male fern extract, halibut liver oil, carbon tetrachloride and tetrachloroethylene).

Naturally the drugs added to the British Pharmacopœia 1948 by means of the Addendum are now incorporated in the text of this edition, but many others have been adopted.

Monographs on biological products now include *Bacillus Calmette-Guérin* vaccine, scarlet fever antitoxin and prophylactic and the Dick test toxin and control. The title "Smallpox Vaccine" is used in place of "Vaccine Lymph" in that this vaccine may now be obtained from chick embryo culture.

The analgesic drugs are reinforced by the inclusion of methadone hydrochloride (amidone) and phenadoxone hydrochloride (heptalgin), while amidopyrine and phenazone are discarded, probably because of their association with the development of agranulocytosis.

To the antiepileptic drugs is added methoin (mesantoin), a modification of phenytoin, and both of these drugs are available in tablet form. For *petit mal*, troxidone (trimethadione) is included.

It is of interest to note that with practically all the new drugs doses are quoted in the metric system only, it being the obvious intention of the British Pharmacopœia Commission that a complete change-over to the metric system will ultimately be effected by evolution rather than by a revolutionary edict.

The recognition of the essential role of insecticides, larvicides and insect repellents in preventive medicine is responsible for the inclusion of several drugs of this class—dibutyl phthalate, effective against the vector of scrub typhus; dimethyl phthalate, of wider utility; and dicophane (D.D.T.), the first to achieve official status, but now eclipsed by the more potent and more rapidly acting gamma benzene hexachloride (lorexane).

While we appreciate that the British Pharmacopœia is essentially a work defining physical, chemical and therapeutic standards, its utility would doubtless be increased if it gave some indication of the percentage strengths and the vehicles in which such drugs as D.D.T., gamma benzene hexachloride, cetrimide and many others might be used for effective application. This indeed has been done in the cases of benzyl benzoate and dimercaprol by their incorporation in an official application and injection respectively. Even in the case of the toxicologically innocent calamine, the official lotion indicates an effective strength in an amended bentonite-thickened vehicle.

While in a constructively critical mood we feel that the British Pharmacopœia might also increase its utility in another direction. In editions prior to the seventh (British Pharmacopœia 1948), doses were quoted for all the local anæsthetics. Except in the case of cocaine hydrochloride, this practice has been dropped and the prescriber has to rely on less authoritative works, or even on the statements of drug manufacturers and vendors, for guidance as to the therapeutic latitude of any given drug. Surely the toxic potentialities of members of this group are such that some indication as to the maximum dose compatible with safety is called for. The same observation applies also to such very potent drugs as tubocurarine. To dismiss the subject with the statement, "the dose is determined by the physician in accordance with the needs of the patient", lacks the authoritative guidance that we have learned to expect from the Pharmacopœia.

The very practical provision for a specific dose to be dispensed, or supplied in capsules, injections or tablets where the prescriber has ordered the preparation by name only without specifying the dose, is extended and in a few cases altered. Notable among the alterations in which increases have been made are injections of insulin which will be supplied at a strength of 40 units per ml unless a solution of some other strength be specified: alkaloidal eye ointments of atropine (0·25% to 1·0%) and hyoscine (0·125% to 0·25%); tablets of propylthiouracil (25 to 50 milligrammes), diencestrol (0·1 to 1·0 milligramme) and ethisterone (5 to 25 milligrammes). In the case of tablets of methylthiouracil, the dose is decreased from 100 milligrammes to 50 milligrammes.

The Pharmacopœia enters a new field by including a monograph on sterilized surgical catgut in which requirements are laid down for diameter and tensile strength in accordance with prescribed methods of test.

This edition under review becomes official in England from September 1, 1953, and will probably be proclaimed in Australia within three months from that date—affording, by then, ample time for study of its contents and for the noting of changes as they affect the prescriber.

The production of each successive Pharmacopœia becomes increasingly complex and onerous, demanding the services of progressively more experts in the wider scientific fields involved in clinical medicine and posology, pharmacology, serological and bacteriological products, antibiotics, hormones and vitamins, galenical pharmacy and pharmacognosy, chemistry in every aspect, sterilization, biological assay and nomenclature. The task of the British Pharmacopœia Commission in blending the work of the many committees and subcommittees involved is a masterpiece of harmonious cooperation—in short, the British Pharmacopœia 1953.

The 1952 Year Book of Urology (November, 1951-October, 1952). Edited by William Wallace Scott, M.D., Ph.D.; 1953. Chicago: The Year Book Publishers, Incorporated. 8" × 5¼", pp. 372, with 79 illustrations. Price: $5.75.

THE longest section in this Year Book is that on the kidney, and this throws an interesting light on the criteria adopted by the editor, W. W. Scott, in the selection of material for the volume. He states that he is convinced that urologists should treat medical diseases of the kidney; but that for them to approach these problems intelligently, a real working knowledge is needed of the many advances of the past ten years in renal physiology. Consequently numerous articles dealing with these advances have been selected. The divisions in the section on the kidney are devoted to anomalies, tumours, tuberculosis, trauma, nephritis and nephrosis, hypertension, renal physiology (much the longest of the subsections), renal insufficiency, miscellaneous subjects and surgical technique. The section on the adrenals is short and is mostly concerned with phæochromocytoma and therapeutic adrenalectomy. The section on the ureter covers anomalies, calculi and surgical technique, and that on the bladder covers tumours, surgical technique, micturition and neurogenic bladder. Most of the section on the prostate relates to surgical procedures, the subjects under which abstracts are grouped being choice of operative approach, transurethral resection and suprapubic, retropubic and perineal prostatectomy; carcinoma of the prostate receives separate treatment. Subdivisions of the section on the genitalia are devoted to the penis, the urethra, epispadias and hypospadias, tumours of the testis, scrotal swellings, the epididymes, vasa and seminal vesicles, infertility and miscellaneous subjects. A section on general considerations contains abstracts on examination of the urine, infections (including gonorrhœa), calculi, anæsthesia, urography, instruments and appliances, and miscellaneous subjects. For good measure the editor offers, as an introductory article, his reflections on the endocrine management of disseminated prostatic cancer. Although apparently prepared with the specialist in urology in mind, this Year Book will be of value to a much wider field of practitioners.

Symptoms and Signs in Clinical Medicine: An Introduction to Medical Diagnosis. By E. Noble Chamberlain, M.D., M.Sc., F.R.C.P.; Fifth Edition; 1952. Bristol: John Wright and Sons, Limited. 9" × 6", pp. 488, with 354 illustrations, 19 in colour. Price: 35s.

THE first edition of this book appeared in 1936, and since then it has been reprinted many times. This, the fifth edition, has had further illustrations added and a most useful new feature is a glossary. The glossary gives the derivation and precise meaning of all the common words used in clinical medicine.

The book is set out under systems and includes chapters on external characteristics of disease, fever, examination of sick children, medical operations and investigations, radiology, and clinical pathology and biochemistry. Each section gives an account of the main symptoms of the system, followed by a very detailed description of physical signs and their method of elicitation. This is followed in some cases by a very brief account of some of the main diseases of the system, with their symptoms and signs. The details of the description, together with the good illustrations, make this an ideal book for the undergraduate student in medicine to learn sound methods of physical examination which are his first introduction to clinical medicine. We consider that the method of history taking and the description of symptoms are not up to the same standard as the section dealing with physical signs and are not really adequate for the student making his first approach to this part of clinical medicine.

Dr. Chamberlain has been assisted by other contributors in some chapters, but nevertheless the book is well integrated and therefore it seems that each chapter has been fully edited by the author. The chapters on the "examination of the sick child" and "medical operations and investigations" are particularly useful to the undergraduate and house physician.

We have no hesitation in recommending this book as an admirable one for undergraduates in their first approach to the problems of clinical medicine.

Fibrocystic Disease of the Pancreas: A Congenital Disorder of Mucus Production—Mucosis. Edited by Martin Bodian, M.D.; 1952. London: William Heinemann (Medical Books), Limited. 10" × 7½", pp. 254, with 133 illustrations. Price: 63s.

AT the Hospital for Sick Children, London, over the last decade an extensive study of this subject has been in progress. This has been a piece of team work of the best kind, and the problem has been approached from the clinical, laboratory, genetic and radiological aspects. The results have been brought together by M. Bodian in collaboration with A. P. Norman and C. O. Carter in this monograph.

The first chapter is on the literature of the subject and it serves as a good introduction to the work under review. The chapter on clinical material includes a series of most informative charts illustrating yearly incidence from 1943 to 1950, age at onset of abnormal motions, age at onset of failure to thrive, weight before and after treatment, age at onset of persistent or recurrent respiratory disorder, age at onset of first major symptom (neonatal onset in 80%), and age at first severe episode during infancy (50% of patients had no severe respiratory episode during infancy). In this chapter radiological investigations and treatment receive adequate attention, and the course of the disease and prognosis are discussed.

The chapter on familial incidence is thorough; that on pathology is excellent, the authors' views being made clear by exceptionally good photographs and photomicrographs.

An informative chapter devoted to discussion is followed by a long one giving case summaries, and the book ends with a chapter on pancreatic dysplasias. This last chapter is added because, while strictly these dysplasias are outside the scope of the monograph, the rare cases of congenital hypoplasia of the exocrine pancreas, and of congenital cystosis of the pancreas, simulate fibrocystic disease in their clinical features and familial incidence, though their pathology is fundamentally different.

The authors state that the incidence of the disease among the families in their series has suggested that it is determined by a recessive gene. The clinical and pathological evidence, they hold, has clearly shown that it is congenital and that some of the features of the disease are present in both. The histological findings have indicated an abnormality of mucus-producing cells throughout the body. In the authors' view the fact that there is a congenital disorder of a single system of specialized cells and that it is genetically determined, is best explained by the hypothesis that there is a disturbance of the intracellular enzyme mechanism concerned in the production of mucus.

No method has been found by which the mucus can be permanently restored to normal viscidity. The two principal aims in treatment are the maintenance of nutrition and the combating of respiratory infection. There has been a remarkable diminution in the mortality rate of fibrocystic disease of the pancreas, excluding meconium ileus, since 1951. The possibility that some of these children may reach adult life makes it necessary to consider the eugenic implications.

This monograph is a valuable contribution which advances our knowledge of fibrocystic disease of the pancreas; many features remain, however, which call for further elucidation. The production is a credit to authors and publishers alike.

Living with Cancer. By Edna Kaehele; 1953. London: Victor Gollancz, Limited. 7⅛" × 5", pp. 160. Price: 8s. 6d.

THIS is a simple, straightforward account, written by a woman, of her thoughts and mode of life after she had been told of her disease, had been given "six months to live", and had undergone all the available treatment. Her thesis is that the victim of cancer must live each day at a time and avoid dwelling on the future and, especially, upon the time she has to put in before the inevitable end. Suggestions are made as to how the sufferer may make use of the solicitude and ministrations of family and friends. From the medical point of view, some value is lost in that it is not clearly laid down precisely what organ or part of the body was involved. However, the criticisms of the hospitals and medical and nursing professions are made by the patient in a very kindly spirit and due allowance is made for human limitations.

This book should be read by all who are responsible for the care of cancer patients, because much of it can be suggested to the patient and relations and friends. This should result in practical action which may ameliorate the lot of the patient, especially if he or she has any tendency to "drop his bundle" or to take undue refuge in resignation.

Office Management of Ocular Diseases. By William F. Hughes, jnr., M.D.; 1953. Chicago: The Year Book Publishers, Incorporated. 9" × 6", pp. 452, with 120 illustrations. Price: $9.00.

AFTER the death of Elias Selinger, who had written "Office Treatment of the Eye" in 1947, the Year Book Publishers chose William F. Hughes to meet the demand for such a concise book. Hughes enjoys a high reputation in the United States of America, and this work can only enhance his prestige. The book is small and easy to handle, yet contains a most helpful condensation of practical ophthalmic knowledge. The author presents those procedures he has found most valuable, and so the reader does not have to search through a series of methods directed towards the same end. This apparent dogmatism is checked by the fact that each chapter carries a short bibliography of important alternative measures, or by the inclusion of references to selected authoritative articles which amplify the text. The reader is told exactly what to do, and how to do it. Drug treatments are amazingly up to date, and dosages, solution strengths, and frequency of application are explicitly given. Twenty pages of "Ophthalmic Formulary" list official and trade preparations under therapeutic headings.

Each chapter deserves high merit, and it is difficult to select any for comment.

Refraction methods for quick accurate determinations are described, and practical visual aids are considered. The influences of Thygeson on conjunctival diseases, Swan on scleral diseases, and Woods on uveitis are obvious among the modern concepts presented. A chapter on radiation treatment—the author's own particular field of investigation—is particularly interesting. Photographs of external ocular diseases contain some impressive pictures, but in some cases detail has been obscured by light reflexes and lack of contrast in black and white reproduction. The fundus photographs are mainly good when considered as fundus photographs, but in most instances they bear very poor comparison with good drawings. A junior ophthalmologist would find difficulty in the interpretation of blurred patches.

"Office Management of Ocular Diseases" can be recommended to ophthalmologists of all grades of experience—to the learner to obtain an authoritative instruction, and to the experienced to serve as a reference for many practical details of modern treatment that cannot possibly be remembered.

Trichlorethylene Anæsthesia. By Gordon Ostlere, M.A., M.B., B.Chir. (Camb.), D.A.; 1953. Edinburgh and London: E. and S. Livingstone, Limited. 7¼" × 5", pp. 90, with five text figures. Price: 7s. 6d.

THIS book by Dr. Gordon Ostlere, of Oxford, is essentially a summary of the literature, with a clinical commentary by the author. It provides a concise, well-produced and handy work of reference. The first two chapters give the history and general characteristics of trichlorethylene; the third, its pharmacology. The author acquits it, on evidence, of the charge of damaging the liver. Primary cardiac failure, whilst a possibility, seems to be very rare. Tachypnœa, the first sign of overdosage, is attributed to sensitization of the pulmonary stretch-reflexes, as described by Whitteridge and Bülbring. Cranial nerve palsy, after the administration of trichlorethylene in absorption systems, is discussed at some length.

The fourth and fifth chapters describe the clinical use of trichlorethylene. The author sets emphasis upon the giving of known percentages, but apparatus which enables this to be done is seldom available to the clinical anæsthetist. The author's precepts are mostly wise, especially when he advocates low percentages of the drug. Thus, he states that "narcosis should first be established with another drug, and trichlorethylene given only to maintain it" (page 62), and "if tachypnœa occurs, trichlorethylene must be withdrawn and the anæsthetic continued with another agent" (page 63). Some statements, however, are questionable. Thus, on page 56, we read that "post-operative vomiting is uncommon", which is a reasonably true statement when trichlorethylene is a supplementary agent, but not when it is the main agent. Again, in reference to tachypnœa, we read (page 63) that "the respiration may be stopped by the injection of a relaxant and pulmonary ventilation be maintained by controlled respiration". This may be permissible in mild tachypnœa, owing to pulmonary reflex sensitivity at a light plane of anæsthesia. In gross tachypnœa resulting from overdosage, the manœuvre may well force a further overdose upon an apnœic patient and lead to cardiac arrest. It is noteworthy, too, that the author nowhere refers to athetoid movement as a sign of overdosage, yet this is frequently seen in children as an intermediate stage between tachypnœa and cardiac irregularity.

The Annual Survey of Psychoanalysis: A Comprehensive Survey of Current Psychoanalytic Theory and Practice. Edited by John Frosch, M.D., in collaboration with Jacob A. Arlow, M.D., Nathaniel Ross, M.D., and Sidney Tarachow, M.D.; Volume I, 1950; 1952. New York: International Universities Press, Incorporated. London: George Allen and Unwin, Limited. 9½" × 6½", pp. 573. Price: 75s.

THIS is probably the most important book on psychoanalysis to appear since the war. It demonstrates the fact that American analysts have come to realize the value of the work done by what is now called the English school of psychoanalysts.

The chapter on child analysis contains an informative summary of the article "The Significance of the Evolution of Psychoanalytic Child Psychology" by Anna Freud. She states in this paper that hypotheses concerning child development hold a key position in psychoanalysis, and she shows how modern methods in this field largely stem from three modifications of her father's theoretical constructions made by himself in his later years:

1. The concept of the normal struggle between the life-instincts and the death-instincts brought about a change in emphasis by which frustration was reduced in importance

as a cause of emotional illness. This biologically orientated theory led Melanie Klein and others to notice new ways by which the conflict between the baby's love for his mother and his fear interfered with later development.

2. After Freud introduced the idea that anxiety is a signal of danger rather than due to a simple transformation of sexual energy, greater attention was given to early development.

3. Freud's opinion that certain mental defences begin earlier in childhood than he originally thought, led to the discovery of the manner in which they operate in emotionally disturbed infants. From this it is held that the successful use of these particular mechanisms is an important feature of normal babyhood.

As a result of these factors advances have been made in the psychoanalytical treatment of both children and adults, neurotic or psychotic. Speaking generally, the book comprises systematically arranged and extended summaries of practically all the books and articles on psychoanalysis published throughout the world during 1950, including psychosomatic treatment which is shown to be not such a simple matter as is sometimes believed.

Textbook of Surgery. Edited by H. F. Moseley, M.A., D.M., M.Ch. (Oxon.), F.A.C.S., F.R.C.S. (England), F.R.C.S. (C.), with a foreword by G. Gavin Miller, M.D., C.M., M.Sc., F.R.C.S. (C.), F.A.C.S.; 1952. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" x 7¼", pp. 918, with 46 plates in colour and 460 text figures. Price: £7 17s. 6d.

MEMBERS of the surgical staff of the Royal Victoria Hospital and of the McGill University, Montreal, have collaborated under the general direction of H. F. Moseley in the production of this "Textbook of Surgery", and the volume has been dedicated to Dr. Gavin Miller, the chairman of the Surgical Department. Having regard to the great developments in surgery over the last fifty years, the abundance of surgical literature, and the universal controversy over the details of a surgical carriculum, the authors deserve commendation for the format of this book and for having completed their task in considerably less than one thousand pages. Ample use has been made of colour plates from the "Ciba" collection and there are nearly five hundred illustrations, most of them excellent and well reproduced. Obviously there has been difficulty in adjusting the allocation of space to the many contributors, and in determining the requirements of a book such as this in contrast to monographs on special diseases. A commendable feature is the inclusion of a list of references for further reading at the end of each section, since it is surely one of the prime duties of the teacher to present the broad outlines of his subject and to encourage the pupil to read further afield on his own account. As this is a collaborative effort, it would be unjust to make any detailed criticism unless it could be done, section by section. In spite of the almost superabundance of surgical literature, there is still room for books of this type and standard, and it can be commended to those who seek an up-to-date summary of general surgery.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Principles of Thoracic Anæsthesia: Past and Present", by William W. Mushin, M.A. (Oxon.), M.B., B.S. (London), M.R.C.S., F.F.A.R.C.S., D.A., and L. Rendell-Baker, M.B., B.S. (London), M.R.C.S., D.A.; 1953. Oxford: Blackwell Scientific Publications. 10" x 7¼", pp. 190, with 193 illustrations. Price: 42s.

This book deals with principles rather than with details of technique.

"Your Brain and its Story", by R. J. A. Berry, M.D., F.R.C.S., F.R.S.E.; 1939. London: Oxford University Press. 7¼" x 5", pp. 184, with 36 illustrations. Price: 8s. 6d.

The sequel to an address given to the Gloucestershire Psychological Association.

"Trends of Life", by F. Wood Jones, F.R.S.; 1953. London: Edward Arnold and Company. 7¼" x 5", pp. 192. Price: 10s. 6d.

A series of fifteen essays.

"Attualita' Terapeutiche", by D. Campanacci, with the collaboration of G. B. Biette, A. Laurinsich, E. Malan, P. Ottonello, A. Rossi, F. Vozza, L. Bocchi, C. F. Porta, M. Tamponi, U. Butturini, G. Capretti, M. Falzoi, L. Landucci, L. Migone, G. Nicora, R. Rossini and W. Telò; 1952. Milan: Casa Editrice Dottor Francesco Vallardi. 9¾" x 6¾", pp. 362, with 17 text figures.

A series of chapters on different forms of therapy.

"The New Way to Better Hearing: Through Hearing Re-education", by Victor L. Browd, M.D., with an introduction by Robert West, Ph.D.; 1953. London: Faber and Faber, Limited. 9" x 6", pp. 264, with 16 illustrations, 13 in colour. Price: 12s. 6d.

This book is directed to persons with reduced hearing and to those associated with them in various capacities.

"The Course of Disseminated Sclerosis: A Close-up of 105 Attacks; Method for Evaluating Therapeutic Approaches", by Paul Thygesen; 1953. Copenhagen: Rosenkilde and Bagger. 10" x 6", pp. 268, with 24 figures.

The book is based on the study of sixty patients manifesting 105 bursts of disease activity defined as attacks.

"Psychiatry and Medicine: An Introduction to Personalized Medicine", by Leslie A. Osborn, M.B., B.S. (Melbourne), M.D. (Buffalo); First Edition; 1952. New York: McGraw-Hill Book Company, Incorporated. 9¾" x 6¾", pp. 508. Price: $7.50.

The aim of this book is "to depict in clinical perspective the close relationship that is developing between psychiatry and medicine".

"Physical Examination of the Surgical Patient", by J. Englebert Dunphy, M.D., F.A.C.S., and Thomas W. Botsford, M.D., F.A.C.S.; 1953. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Proprietary, Limited. 9¾" x 6¾", pp. 340, with 188 illustrations. Price: £3 11s. 3d.

The authors have focused on technique to the greatest extent, but have also discussed certain disease processes.

"First International Symposium on Yaws Control", World Health Organization: Monograph Series, No. 15; 1953. Geneva: World Health Organization. Australia: H. A. Goddard, Proprietary, Limited, 255A George Street, Sydney. 9¾" x 6¾", pp. 422, with 32 plates. Price: 22s. 6d.

Over seventy health workers from all parts of the world attended the symposium. The report is published in eight parts. Summaries are in English and French.

"Studien am Menschlichen Sperma", by Charles A. Joël; 1953. Basel: Benno Schwabe and Company. 8¾" x 6", pp. 204, with 66 illustrations. Price: Swiss francs 28.

The author is principal of the Institute for Research and Treatment of Reproductive Endocrinology at the city hospital, Hadassah, Tel-Aviv.

"The Symptoms and Treatment of Acute Poisoning", by G. H. W. Lucas; 1953. London: H. K. Lewis and Company, Limited. 7" x 4¾", pp. 320. Price: 27s. 6d.

The purpose of the book is to provide up-to-date information on the symptoms and treatment of acute poisoning for most of the drugs met with in medical practice.

"Handbook of Treatment of Acute Poisoning", by E. H. Bensley, M.B.E., B.A., M.D., F.A.C.P., and G. E. Joron, B.A., M.D., C.M., Dip.Int.Med.; 1953. Montreal: Renouf Publishing Company, Limited. 6¾" x 4¾", pp. 201. Price: $2.50.

Primarily a guide to treatment in acute poisoning; medico-legal aspects are not included.

"A Guide to the Care of the Young Child (Infant and Pre-School Ages): For Students of Infant Welfare", by Vera Scantlebury Brown, M.D., Ch.B., revised by Kate Campbell, M.D., B.S.; 1951. Melbourne: Department of Health. 9¾" x 6¾", pp. 252, with seven illustrations.

First published by Dr. Vera Scantlebury Brown in 1929.

"Medical Hypnosis: New Hope for Mankind", by Dr. S. J. Van Pelt, Dr. Gordon Ambrose and Dr. George Newbold; 1953. London: Victor Gollancz. 8" x 5¾", pp. 190, with two text figures. Price: 13s. 6d.

The authors discuss the application of hypnosis to nervous conditions, child guidance and gynæcological conditions.

The Medical Journal of Australia

SATURDAY, AUGUST 1, 1953.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ARTIFICIAL HEART.

To devise a double pump which could produce something like the normal systemic and pulmonary circulations has long been a dream of the physiologist and, since the rise of thoracic surgery, a dream of the surgeon. The difficulties have been great; one is to prevent coagulation of the blood; another is concerned with the fact, very early perceived by Starling, that the lungs do more than aerate the blood, as some subtle changes in the cellular contents are invariably present when the real pulmonary circulation is omitted. Then a pump which will drive the blood forward without causing hæmolysis is not easy to construct; also the blood to be equilibrated must not be bubbled as J. S. Haldane and Joseph Barcroft forcibly pointed out. Another difficulty is the delicate adjustment, discovered by Haldane, of the amplitude of aeration in the lungs based on the carbon dioxide partial pressure in the arterial blood in contact with the respiratory centres; attempts to surmount this have been made by B. J. Miller, J. H. Gibbon and M. H. Gibbon.[1] One improvement in technique after another has been made with valuable contributions from Crafoord and Björk in Sweden, Kolff and Jongbloed in Holland, André Thomas in France, Leland Clark in America and Tyrer in Australia, until, as D. G. Melrose states in the article about to be discussed, "the stage is almost set for clinical use". The most recent attack on the problem will be found in two articles, one entitled "Experimental Physiology of a Heart-Lung Machine in Parallel with Normal Circulation" by D. G. Melrose, J. W. Basset, P. Beaconsfield, L. G. Graber and R. Shackman, the other "A Mechanical Heart-Lung for Use in Man", by D. G. Melrose, with a foreword by Ian Aird, both appearing in the *British Medical Journal* of July 11, 1953. This research has taken some four years to conduct, and the presentation displays evidence of exceptional attention to detail with the recognition of possibilities of going wrong and the methods to prevent such happenings. Dr. Melrose with commendable caution comes to the conclusion that a heart-lung machine to replace the heart and lungs of a patient subjected to cardiac surgery presents difficulties in design and working too great at present to overcome, and so he has, with his associates, fallen back on a heart-lung mechanism in parallel with the existing circulation and so capable of being described as "assisted circulation"; that is, an adjustable fraction of the total blood can be sent through an aerating device and returned with the correct carbon dioxide and oxygen partial pressures and consequently the correct quantities of each. The Dale-Schuster instrument for pumping was already on the market manufactured by C. F. Palmer, the physiological instrument maker, but Melrose preferred another device for the two pumps, employing with each a valveless elastic tube containing the blood and squeezed by the action of a roller. He soon found that, if the squeezing process was too vigorous, hæmolysis occurred, and therefore the "pump" was designed so that the lumen was just obliterated by the pressure of a cam without any shearing stress; thus injury to the erythrocytes was prevented. The new oxygenator employed was a rotating cylinder with a slight tilt; blood flowed by gravity from one end to the other and was spread over a multitude of surfaces formed by blades projecting into the lumen of the cylinder. Each pump was capable of delicate adjustment to prevent accumulation of blood in any one circuit. In the animal experiments heparin or dextran sulphate was given to prevent clotting. The tubing and catheters were made of polyvinyl chloride, which is not wettable with the blood and so inhibits clotting. It is interesting to note that this same substance was employed for a similar purpose by John J. Osborn, of the New York University College of Medicine.[1]

No doubt considerations of space prohibited Dr. Melrose and his collaborators from giving a full bibliography and critical commentary concerning his predecessors, but many readers will regret that no mention is made of the researches of Dr. J. H. Tyrer, of the University of Sydney, whose paper, "The Peripheral Action of Digoxin on Venous Pressure: A Study Using Sheep with an Artificial Heart", appeared in THE MEDICAL JOURNAL OF AUSTRALIA on April 12, 1952. Dr. Tyrer's purpose in devising an artificial heart was to remove the cardiac factor completely in the investigation of the alterations in venous pressure produced by digitalis. Dr. Tyrer showed conclusively that in the sheep with the heart out of action digoxin produced a rise of venous pressure, thus proving peripheral action of the drug. Before he could put this proof to the test he had to devise a double pump "heart" and an aerating mechanism. He used the Dale-Schuster pump already referred to, an instrument manufactured by C. F. Palmer. It is possible that many who have some experience in such matters will prefer Dr. Tyrer's oxygenator to the complicated mechanism invented by Dr. Melrose, for in this oxygenator the blood is spun into a thin film on the inside of a "Perspex" chamber and flows down this in contact with a mixture of 95% oxygen and 5% carbon dioxide. In this apparatus there will be less agitation of the blood and

[1] *Ann. Surg.* (1951), 134: 694.

[1] *Science*, May 15, 1953, 537.

consequently less hæmolysis. The eventual goal of getting a temporary circulation of artificial character and allowing the surgeon to operate on a heart containing no blood in its chambers is coming nearer, and success may be early expected.

THE PATIENT OUT-PATIENT.

LAST year *The Lancet*, with considerable courage, published an article on appointment systems in hospital out-patient departments by two laymen, a retired brigadier and a statistician.[1] They were, respectively, J. D. Welch, a member of a team investigating the functions and design of hospitals for the Nuffield Provincial Hospitals Trust and the University of Bristol, and Norman T. J. Bailey, statistician to the medical school in the University of Cambridge. In their paper they set out details of the length of time patients often had to wait in out-patient departments and analysed it to see how much it was due to early arrival of the patient and how much to late arrival of the consultant. They put their finger on certain weaknesses in many out-patient attendance systems, whether an appointment arrangement existed or not, and suggested practical measures for improvement. Their paper was in some respects not very happy. Only an incurable optimist would expect the thought processes of a retired soldier and of a statistician to coincide in detail with those of a clinician; and a certain atmosphere of discipline and stop-watch mathematics about the article, highlighted in an unfortunate comparison of attendances at a ladies' hairdressing establishment with those at an out-patient department, provided an attractive bait for the consultants. It might almost be suspected that it was a deliberate and not ill-humoured bait. At any rate, the consultants rose to it in *The Lancet's* correspondence columns. Most of the letters were characterized by vigour rather than logic and failed to disturb certain sound points brought out by Welch and Bailey, not the least being the unpunctuality of consultants. Despite certain reasonable objections, the argument for an appointment system for out-patients seems thoroughly sound (no consultant would expect all his morning patients to arrive at 9 a.m. or all his afternoon patients at 2 p.m.), and if an appointment system is established, punctuality and common sense will do much to make it work to everyone's advantage. The reduction of time wasted by patients in waiting is important on many grounds, including those of common humanity and national economy, and a wearisome wait for patients, sometimes without food in an uncomfortable waiting hall, is an anomaly when viewed as an intrinsic part of the patient's treatment.

Apparently wishing to keep the matter alive, *The Lancet* has recently given prominence[2] to evidence, brought forward at a meeting of the National Federation of Women's Institutes, of the kind of hardship that lack of an efficient appointment system entails for patients, especially country patients. We need not concern ourselves with the details here. The type of story—a whole day spent on a short out-patient visit, long hours in a casualty department and so on—is familiar enough and rather depressing if we are not in the unhappy state of having (in Welch and Bailey's words) "grown accustomed to seeing patients waiting". We may be sure that, in general, hospital administrative officers, consultants and, certainly, patients would like to do away with the faults inherent in the older out-patient systems. Despite considerable experiments, it is obvious that they still have their difficulties in Great Britain. It would be of interest to know what progress in these matters is being made in Australian hospitals.

[1] *Lancet*, May 31, 1952.
[2] *Ibidem*, July 4, 1953.

Current Comment.

INJURIES TO THE COMMON BILE DUCT.

THE importance and seriousness of stricture of the common bile duct will be readily admitted by all who undertake surgery of the upper abdominal organs. The methods of surgical relief have been discussed in this journal recently. The question has been reviewed from the standpoint of prevention in a communication from the Henry Heywood Memorial Hospital, which is an institution of 120 beds in Massachusetts. F. Richard Pierce and Joseph P. Marnane have published an analysis of a small series of cases derived from 539 consecutive operations on the gall-bladder or the biliary tree in a ten-year period up to the end of 1950.[1] Though they present only four patients in this review, they point out that all of them appeared on admission to hospital to present a simple and straightforward surgical problem, but were unfortunate enough to undergo additional operative procedures with all the attendant trouble and interference with ordinary comfort of living. This small series is of some interest because the hospital in question is a small community hospital, in which, as the authors point out, the patients are better known to the staff than in larger centres, and in which the members of the surgical staff work in closer mutual interest. They further state that their results are paralleled by those of larger institutions, and quote such figures as a total of 184 cases of stricture of the common bile duct treated in the Mayo Clinic over a period of twenty-four years ending in 1948. Lahey has also been quoted as saying that a large series of 314 such cases which he had collected constituted a serious criticism of surgery. Pierce and Marnane comment that analyses of such series seldom emanate from the smaller institutions, though these may supply the majority of patients referred to larger centres for treatment. They are probably correct in suggesting that it is not merely a question of reluctance to report such happenings when they occur after trauma and not as the result of undoubted inflammatory complications, but one of the record system. Every member of a hospital staff who has undertaken a statistical inquiry on the records knows the shortcomings in these, and here perhaps there is a certain advantage in making such inquiries in a hospital of compact size, in which members of the staff will frequently be able to help from their memories, or, more reliably, from their personal notes. In the Heywood figures, small as they are, in no instance was the diagnosis of biliary tract obstruction recorded in the hospital files, and in only one of the four was the cause established as inflammatory. The surgeons cooperated in constructing the after-history of their patients, particularly in discovering whether jaundice had been observed. It is of some interest that review of the gall-bladder surgery undertaken in this hospital during the last six years shows no record of an instance of injury to the common bile duct. This has possibly been related to the interest shown in the subject by the surgeons, who had several discussions amongst themselves. Pierce and Marnane remark that a study of such cases invokes the aid of intelligent caution and awareness of the problems involved, even in the so-called "easy" gall-bladder operation. They think that this good record is due to the

[1] *New England J. Med.*, April 14, 1953.

application of certain precepts derived from experience, and briefly state these as follows. The frequency of congenital anomalies in the biliary system should be borne in mind; the exact location of all structures should be established so that bleeding from the cystic artery will be controlled, and the need for hasty application of clamps will be avoided; the cystic duct, particularly its angle with the common duct, must be demonstrated, and it should be tied before clamping, and without tension on the gall-bladder. Inflammatory lesions should be a warning that cholecystostomy may be wiser, and the surgeon should remember that there are no "easy" cholecystectomies. No doubt experienced surgeons will regard such advice as obvious truisms, but it is surely of interest that the principles of what may be termed preventive techniques in surgery should be firmly established in those smaller institutions where such excellent work can be done.

ACCIDENTS IN THE HOME.

THE Home Office in Great Britain has published a report on accidents in the home.[1] The report is the work of an inter-departmental committee appointed for that purpose. It is not a long document, but it is full of interest and sets out facts which should give rise to serious thought in any modern community. The inter-departmental committee was set up in 1947 by the Home Secretary with the following terms of reference: "To coordinate departmental action in connexion with the prevention of accidents in the home, and to maintain contact with unofficial organizations interested in the subject." The magnitude of the problem is astounding—during the ten years, 1940 to 1949, over 60,000 people in Britain died from accidents in their homes, compared with about 48,000 deaths on the roads. Since 1943 there have been well over 1000 more fatal casualties each year in the home than on the roads. Most of the victims are young children or old people; more than 25% are under fifteen and more than 50% are over sixty-five years of age. Another remarkable fact is that more children under fifteen years of age die as a result of home accidents than from any single infectious disease. Between the ages of one and five years an accident in the home comes third in the most frequent causes of death. The number of non-fatal accidents is hard to determine. However, an example is quoted for a congested area in Birmingham. Here 9% of children under ten years of age and 3% of adults were treated at the Birmingham Accidents Hospital for home accidents—the subjects were 4% of the inhabitants of the whole area. This was a congested area and so the figures cannot be looked on as typical for all areas.

Accidents in the home were discussed in the editorial columns of this journal in January, 1950, and mention was made of the Royal Society for the Prevention of Accidents which had published a series of pamphlets on safety measures. It was pointed out that major factors involved in the high death and injury rates were carelessness, the speed of the present-day mode of existence and unawareness of the potential hazards in the home. The present inter-departmental report sets down the two most important hazards as faulty design and equipment, and human frailty in its broadest sense. Of the two, the human element—ignorance, carelessness and physical disability—is stated to be the more important. Most people will agree that these factors are correctly stated, and yet it may be questioned whether carelessness accurately describes the proneness of human attention to wander from even a set task with defined steps to achieve a certain object. With the best will in the world a man engaged in such a task may have his attention momentarily distracted; he may become tired or have outside worries preying on him and making it easier for his mind to wander. This is not really carelessness; lack of concentration it may be, but it is just plain human frailty, the word used in the report. Accident proneness is not mentioned—it must surely operate in the home, as it does elsewhere.

An analysis is made of the different kinds of accidents. Falls accounted for 58% of the total, burns and scalds for 13%, suffocation for 12% and coal-gas poisoning for 8%. About nine-tenths of the falls, over half the burns and scalds and nearly two-thirds of the coal-gas poisonings happened to people over sixty-five years of age. At least eight out of ten suffocations and one in five of the burns and scalds happened to children under five years old.

The economic aspect of the subject is discussed in this report, but we may pass over this, to deal with the contributory causes. When accidents involving falls were investigated it was found that 8% of those covered by the inquiry were primarily due to some fault in the building design and a further 20% to poor maintenance; inadequate lighting played a part. Most accidents, however, were due to risks inherent in ordinary domestic activities, especially during busy periods. Fireguards are mentioned. It was found in the course of a survey into the use and cost of domestic heating that in over 1000 households visited where a coal fire was alight, in only 36% of those with children under six years of age, and in 13% with children between seven and fourteen was a fireguard used. A mere 7% of the homes with old people over seventy years of age had guarded coal fires.

In the prevention of accidents in the home it is stated that even the most scrupulous care cannot eliminate every hazard from the average home. At the same time "it is equally vital that people should be taught how to guard against the many hazards of everyday life". The average individual, we are told, has not only to learn how to prevent accidents in his home; he must first be convinced that the various dangers exist. We do not propose to describe the suggested methods of prevention by propaganda and legal enactment. Perhaps it would be better to refer to certain precautions against fire set out in one of the appendices and leave it to readers of this journal to ask themselves whether they always do what is suggested. One should see that the cigarette is out, the iron is unplugged, gas taps are turned off, fires are guarded, and the wireless is switched off, or better still, disconnected. It is of such precautions, *inter alia*, that the kingdom of safety from accident in the home is built.

[1] Accidents in the Home: Report of the Standing Committee on Accidents in the Home; Home Office, 1953, London: Her Majesty's Stationery Office. 9¼" x 6", pp. 10. Price: 6d. net.

INTERPRETATION OF FRACTIONAL TEST MEALS.

ALL methods of measurement used in clinical medicine need some care in their application, and to this fractional test meals are no exception. The ability of the gastric secreting cells to do themselves justice when presented with an unexciting meal has been called in question, but quite apart from such considerations there is further possibility of error in assessing the acidity of the gastric contents. This question has been raised again by J. N. Hunt,[1] who points out the principles to be followed as advised by two of the well-known early workers in this field, Bennett and Ryle. He reminds us that they emphasized the fact that the acidity of the gastric contents at any moment is the resultant of the action of the stomach in secreting and in emptying. It is obvious that concentration of the acid in the gastric contents will tend to be high when only a small volume of the test meal remains in the stomach even though the gastric juice remains constant in amount and strength. Conversely, a large amount of gastric contents will cause such dilution that the acidity will be low. Hunt states that the underlying principles have been largely neglected, and remarks that the term "gastric acidity" is often used as if it meant the same as "gastric secretion". Thus, the function of secretion has been confused with that of emptying of the stomach in relation to the findings of a test meal. Further, even though the importance of emptying has been realized, it has not always been easy to determine the relative significance of gastric emptying to gastric secretion because

[1] *Guy's Hosp. Rep.* (1953), 102, Number 2.

the patterns of these two functions are not clearly known in any given subject of investigation. Hunt has now studied the gastric functions by a pectin test meal applied to a number of sudents, and by serial observations has found it possible to imitate *in vitro* the behaviour of the stomach after the administration of a test meal. The emptying pattern of the experimental subjects was found to be graphically of exponenital form, and easily reproduced by syphoning water from a glass cylinder. A set acid concentration was selected as being the highest likely to be met in man, and one of the variables was thus standardized. Samples withdrawn from the cylinder closely followed the pattern found in the students in regard to their gastric acidity. In the "glass stomach" experiments the syphon was set to run at a rate of 3·3% of the volume per minute. The remaining volumes after each ten minute interval were plotted as a curve, which was found to follow the pattern of the human subjects. The experiment was then repeated with the addition of acid at a rate based on the mean rate found in 20 subjects, and at regular intervals the acidity was estimated. Other experiments were carried out, emptying rates double and half of the mean being used, whilst the rate of excretion to the mean was held. Further trials were made by the use of a constant rate of emptying, but an excretion rate half, double or treble the mean. The results of these experiments were then summarized in a composite graph which shows that doubling the proportion of the gastric contents leaving the stomach has the same effect on the resultant acidity of the stomach contents as doubling the rate of secretion. The author finally points out that it is impossible to obtain information about the secretory activity of the stomach by studying the acidity of the stomach contents through the medium of an ordinary test meal. Perhaps there are few who would take the results of the graphs of test meals as mathematically certain, but it may be that the variables are not as clearly recognized as they might be. Perhaps, as Hunt states, the gruel fractional test meal has too much asked of it.

THE TREATMENT OF SULPHONAMIDE-RESISTANT DYSENTERY.

The response of infections to specific remedies which have been proven of value is not always as satisfactory as previous experience has led us to expect; Nature has her own riposte in the form of drug resistance. Lieutenants B. T. Garfinkel and G. M. Martin, James Watt, Captain F. J. Payne, Colonel R. P. Mason and Albert V. Hardy have published their observations in 1408 cases of acute bacillary dysentery in prison camps in Korea where the treatment of large numbers of men was complicated by the fact that the Shigellæ which were the predominant variety of infective organism showed the phenomenon of resistance, thus leaving the physicians in charge with little except supportive therapy to fall back upon.[1] They remark that the dysentery encountered in the United Nations prisoner-of-war camps in Korea followed the accepted historical pattern and was common amongst these groups, despite the preventive measures of hygiene adopted. This lack of effectiveness of such methods was, they think, due to the high endemic level of Shigella infections in prisoners at the time of capture. The quality of sulphonamide resistance was soon evident on clinical grounds, but was later confirmed by laboratory methods. Limited trials showed that some of the newer antibiotics were effective, and it seemed wise therefore to carry out critical observations in these camps.

The camp in which this work was done was composed of a number of enclosures, within which there were a number of smaller compounds. Each compound had a dispensary staffed by Korean physicians, most of whom were prisoners-of-war. These medical officers held sick parades and used drugs supplied to them for all patients not needing admission to hospital. All patients who did not respond to standard treatment or who were seriously ill were admitted to hospital. The ratio of admissions to patients seen was about one to 15 or 30. Diarrhœal disease was found to be due to a variety of infective agents, but the majority of patients were found to be suffering from bacillary dysentery. About 10% of men admitted to hospital had acute amœbic infection, and a small proportion were infected by the Salmonella group. Sigmoidoscopic and bacteriological investigations were a matter of routine. It is characteristic that, despite the mild type of disease in the ambulatory patients, the men admitted to hospital were severely ill. The administration of fluids and electrolytes was a routine procedure. Some 16% of the patients showed evidence of gross dehydration. The sigmoidoscopic picture rarely included ulceration; a diffuse inflammatory process was more common. The findings were in fact consistent with those found in Shigella infections, and some adequate substitute for sulphonamides was clearly desirable. Trial soon showed that certain of the antibiotics were very effective, and the evaluation of the drugs was assisted by the homogeneous nature of the group treated. The bacteriological observations were particularly valuable, since these were purely objective. In general the predominant strain found in all the patients affected was the Flexner, but usually sufficient clinical anxiety is not felt in infections of this type to warrant unusually potent remedies. The authors found that tetrramycin, aureomycin and chloramphenicol were the most effective antibiotics in their Korean cases. The dosage adopted was relatively small; four grammes in three doses in twenty-four hours yielded results as satisfactory as the larger doses recommended for these preparations. Spreading the dose over a longer period had no apparent advantage, and the same was found when half the quantity was administered in a single dose. Polymixin B was also tried, but without effect. Even if dysentery still remains a menace in groups such as those comprised of prisoners-of-war, there seems good reason to remain confident that severe affections may still be readily dealt with even if they are due to sulphonamide-resistant strains, but there is no guarantee that the property of resistance may not be acquired for other therapeutic substances.

[1] *J.A.M.A.*, April 4, 1953.

THE TREATMENT OF PNEUMONIC PLAGUE.

Thanks to an effective quarantine system, infection with *Pasteurella pestis* seldom enters the thinking of most Australian practitioners. However, complacency in these matters is not justified, and it is useful to know, apart from the general interest aspect, what could be done in an emergency. According to published reports, the effectiveness of the sulphonamides, and especially of a combination of hyperimmune serum and sulphonamide, in the treatment of bubonic plague has been amply shown in India, but the results with pneumonic plague have not been encouraging. As late as 1948 the mortality rate from plague pneumonia remained at nearly 100%. Then, after encouraging experimental work, streptomycin was used successfully in the treatment of patients with pneumonic plague, and it is now firmly established that streptomycin is rapidly curative when therapy is instituted during the early phases of the illness. These facts are brought out in a recent paper by a group of collaborators working in the United States and in Madagascar; they are F. R. McCrumb, junior, S. Mercier, J. Robic, M. Bouillat, J. E. Smadel, T. E. Woodward and K. Goodner.[1] It is pointed out in this paper that, despite the well-established efficacy of streptomycin, certain factors make it important to expand the known range of effective drugs in this fulminant disease: first, the potential toxicity of streptomycin limits its use in infectious processes; second, development of resistance to streptomycin by Gram-negative organisms is common and may well affect *P. pestis*; third, streptomycin exerts limited inhibitory action on Gram-positive bacteria which may provoke secondary infection during the course of plague

[1] *Am. J. Med.*, March, 1953.

pneumonia. In view of this, trial has been made of the newer antibiotics in the treatment of pneumonic plague, and 13 patients proved to have the condition through isolation of *P. pestis* from upper respiratory tract secretions have recovered under various forms of antibiotic therapy. Five were treated solely with chloramphenicol, two with terramycin and three with streptomycin; three received a combination of antibiotics. All the antibiotics produced a dramatic clinical response in patients first receiving therapy prior to the twentieth hour of onset of illness. It must be noted, however, that two patients treated later in the course of their illness (the twenty-fourth and fortieth hours of the disease) succumbed to the infection; cortisone failed to influence the result in these cases.

In the light of these results and having in mind the potential and actual disadvantages of streptomycin, which are not shared by chloramphenicol and terramycin, we can readily appreciate the value of these newer antibiotics. It is to be emphasized, as McCrumb and his colleagues point out, that successful treatment of pneumonic plague with chloramphenicol and terramycin, as with streptomycin, is contingent upon early diagnosis and prompt administration of the specific drug within the first twenty hours after the onset of illness. When the drug is given later in the course of the pneumonic infection, the present experience is that a fatal outcome invariably ensues in spite of rigorous antibiotic treatment and energetic supportive measures. A certain degree of caution is required with chloramphenicol in view of reports in the past year or so indicating the occasional occurrence of a depressive effect on the bone marrow, but this is scarcely a major consideration in these circumstances. The notable point is that chloramphenicol and terramycin, if given early enough, can abolish *P. pestis* from the sputum, deal with most superimposed infections and produce a rapid improvement in the patient's clinical state. The infection that has gone on to an advanced stage provides quite another problem.

THE FEEDING OF ATHLETES.

MANY ideas firmly held by athletes, their coaches and others on the subject of food during athletic training belong properly to the realm of fantasy. Such traditions are not easily dispelled, but an article on the subject[1] prepared at the request of the Council of Foods and Nutrition of the American Medical Association should help to put the matter on a sensible basis. The authors, H. L. Upjohn, Julia A. Shea, F. J. Stare and Lou Little, come together with varied qualifications and experience, seeking to combine in their paper "the theoretical and empirical points of view of the professor of nutrition, the coach, and the athlete". They point out that good nutrition is not the sole solution to producing a winning team, but attractive nourishing food in the right amount is an important step in that direction. They consider first the actual food athletes should eat and make it clear that feeding an athlete is basically not different from feeding an average citizen. An adequate diet is essential all the time, and the emphasis should be on that, not on what is eaten on the day of a game. There are no magic foods which produce super power or agility. "The same meat, milk, eggs, vegetables, fruits, enriched and whole grain breads and cereals that are fundamental to the health of every person are needed by the athlete." However, the athlete's energy needs exceed those of a moderately sedentary person, by as much as 100%, depending on the sport and the degree of participation by each person. An athlete needs enough food to balance his energy intake with his energy output and to reach or maintain the body weight that he and his coach consider will provide maximum efficiency for a given sport. This varies with the individual, but may be gauged by weekly recording of body weight. The exact caloric requirement for a given athlete cannot be prescribed. With regard to protein food it is pointed out that a sedentary person needs as much as a very active person, although he needs less fat and carbohydrate. To the extent that athletes through training actually increase their muscle mass, they have an increased requirement for protein. In practice, however, the liberal protein intakes recommended for the sedentary adult suffice for these needs as well as the "wear and tear" of replacing old tissues. Protein needs are governed by rate of growth rather than by activity. Generally speaking, proteins usually supply 10% to 15% of the total caloric requirements, fat 20% to 30% and carbohydrate the rest, but considerable variation is possible. Vitamins and minerals can probably take care of themselves. Under ordinary conditions extra salt with drinking water is not necessary if enough salt is used with each meal. Quick reduction by boxers or wrestlers to "make a weight" should take three to six days.

Foods that the athlete should include in his daily diet in all circumstances are a large serving of protein food, two or more glasses of milk, a variety of vegetables (especially green and yellow), fruits (especially citrus), and generous amounts of enriched and whole grain breads and cereals. Milk is not a necessity, but is a good source of high quality protein, calcium, phosphorus and riboflavin. Variety is important, including in meat served, which need not be only beef. Vitamin supplements are unnecessary. Careful preparation and good serving are most important. To those who have weight problems concentrated sweets, rich desserts, gravies and salad dressings should be served sparingly; but—and in this Upjohn and his colleagues will no doubt find many to disagree with them—it is considered that as long as protective foods are not neglected and weight is kept at the desired level, cakes, pies and the like are not harmful to the athlete. From the point of view of morale it is most valuable for athletes to eat the kind of food they normally enjoy.

The time at which meals should be eaten presents another important problem. For obvious physiological reasons it is not good to eat or to consume large amounts of fluids immediately before or after exercise. It is wise to accustom the body to "game conditions" as soon as possible by simulating them in meals and practice conditions during training. The paper suggests a number of eating schedules conforming to these principles. On the question of need for sources of quick energy supply or water during a game, it is pointed out that the normal body can usually furnish energy required from its reserves, so that a sugar supplement is not needed; there is no objection to taking a judicious amount of fluids during a contest. The paper ends with some remarks on the psychological aspects of eating and, while stressing their importance, makes it quite clear that they depend very largely on the common sense and tact of the coach. The aim is laid down that athletes should be encouraged "to eat and like a variety of foods—meat, milk, eggs, cheese, fish, fruits, vegetables, and cereals and bread—every day and to maintain weight at the desired level". Since these are the principles of good nutrition for anyone, they should not be difficult to teach to athletes.

Apart from popular opinions a good deal on various aspects of this subject has been published in scientific journals. It is of interest to recall a paper by F. S. Cotton, of the University of Sydney, published in this journal on November 23, 1940, in which he described a controlled experiment on the effect of glucose on competitors in sprint swimming races. The results indicated that, contrary to widespread belief, the taking of glucose prior to a sprint race is slightly disadvantageous, and that certainly it is not advantageous. This view, although it is based on carefully observed facts, will undoubtedly be rejected by many athletes, as will any disparagement of the value of concentrated vitamin preparations. In his Lumleian lecture for 1951 on physical exercise Sir Adolphe Abrahams[1] referred to evidence offered in support of extra vitamins as an aid during physical tests; but he quoted a further investigation which showed convincingly that there was no evidence whatever of any such benefit. Armed with facts like these, the doctor can offer sound advice to athletes when it is sought. Certainly, his task may be, as Abrahams puts it, neither easy nor agreeable, but the iconoclast is seldom popular.

[1] *J.A.M.A.*, March 7, 1953.

[1] *Lancet*, May 26, 1951.

Abstracts from Medical Literature.

THERAPEUTICS.

Viomycin.

F. W. Pitts *et alii* (*Dis. Chest*, March, 1953) have administered viomycin to 80 patients with pulmonary tuberculosis in a dose of two grammes every third day either alone or in combination with streptomycin or para-aminosalicylic acid (PAS) for one hundred and twenty days. They think that this drug is capable of exerting a favourable effect on the course of the disease, but that its effectiveness is less than that of streptomycin and about equal to that of PAS. The effect of viomycin combined with either of the other drugs was better than that of any of them employed alone. The toxic effects which may occur when viomycin is administered daily are never more than slight, transient and reversible when it is administered intermittently.

Cardiac Arrest.

J. Bonica (*Anesth & Analg.*, January-February, 1952) reviews 13 cases of cardiac arrest out of a total of 64,400 anæsthetics; five of the patients recovered without any permanent effects. Ætiological factors included: increased sensitivity of the heart caused by adrenaline; certain anæsthetics, particularly chloroform, cyclopropane and ethyl chloride; hypoxia or anoxia; reflex mechanisms either vagal or sympathetic, such as those following endotracheal intubation, irritation of the tracheo-bronchial tubes by anæsthetic vapours, blood or suction catheters, and manipulation of the hilum of the lung, mesentery, vagus nerve or carotid sinus; depression of the myocardium by toxic doses of the anæsthetic drug; mechanical interference with cardiac activity due to retraction in the chest or faulty posture; embolism due to blood, fat or air; acute coronary occlusion. The author states that diagnosis of acute cardiac arrest requires the constant attention of the anæsthetist and should be made when the sudden disappearance of blood pressure and pulse in the large vessels in the neck is combined with a poor colour and dilated pupils. The heart should be auscultated immediately to detect the mill-wheel murmur of air embolism, and the surgeon notified so that he may confirm or discount the diagnosis by palpating directly any large vessels within his reach. Treatment consists firstly of prophylaxis, which includes proper pre-operative preparation, sedation, administration of fluids and electrolytes, quinidine therapy in selected cases, atropinization, and proper operative management. Active treatment in an established case of cardiac arrest should be started immediately and is directed towards immediate restoration of oxygen supply to heart and brain, and restoration of spontaneous cardiac and respiratory activity. The first aim requires immediate artificial respiration and circulation. Artificial respiration is most effectively accomplished by inserting an endotracheal tube and connecting it to an anæsthesia machine. Artificial circulation can be effected only by direct manual compression of the heart at a rate of 50 to 60 per minute, preferably through an opening in the chest. This can best be carried out by making an incision in the fourth intercostal space, from the posterior axillary line to two inches lateral to the sternum, and cutting the costal cartilages of the fourth and fifth ribs. Efficient massage should raise the arterial pressure to 50 to 70 millimetres of mercury. Reestablishment of cardiac and respiratory activity may occur spontaneously, particularly if massage is started before anoxia affects the heart, but if the heart remains flaccid a small dose of adrenaline (0·25 milligramme) with procaine should be injected directly into the heart under vision. When ventricular fibrillation has occurred it may be necessary to counteract the condition either by intracardiac injection of procaine or "Pronestyl", or by serial defibrillation with an electric current of 1·0 ampere (60 cycles) passed through the heart. If air embolism is the causal factor, an attempt should be made first to withdraw about 15 mils of air from the right ventricle by a needle inserted through the fifth right or fourth left interspace and directed medially. If the heart does not start immediately direct massage is commenced following thoracotomy. The prognosis is favourable only if adequate artificial respiration and circulation are commenced within three minutes after the onset of acute cardiac arrest. The anæsthetist should direct the surgical team in the management of the emergency, and if necessary perform the cardiac massage himself in the absence of a surgeon familiar with this procedure, provided there is someone else to apply artificial respiration.

Gold Therapy for Rheumatoid Arthritis.

T. E. Nugent, F. W. Nugent and F. B. O'Neil (*Canad. M. A. J.*, March, 1953) discuss gold therapy for rheumatoid arthritis and review the results obtained in a series of 29 privately treated patients. They consider that gold is the best available agent for the treatment of the rheumatoid arthritic, and that in properly selected cases it produces a higher percentage of remissions than the current literature indicates. Also, toxic manifestations from its use are not very common when patients are carefully selected and when simple laboratory tests are used before each injection. It is held that chrysotherapy can conveniently and safely be made a part of general office routine. The authors are satisfied with the diagnosis if the patient presents progressive polyarthritis with muscle-wasting and periarticular thickening. Subcutaneous nodules and severe small-joint crippling, when present, complete the picture. With these findings a rapid blood sedimentation rate corroborates the diagnosis. Treatment is withheld in cases of nephritis, liver damage and pregnancy. The "burnt-out" arthritic should not be treated, for this is the type of case in which gold is highly toxic. Gold is of no value in cases of osteoarthritis. The authors have found that hypochromic microcytic anæmia is a constant concomitant of this disease, and that iron and liver do not produce a material response in the blood picture. The answer to the problem appears to be the transfusion of 500 mils of whole blood. Physiotherapy to the affected joints is advocated, in the way of physiological rest, supervised exercise and the application of heat for symptomatic relief. The authors regard "Myocrisin" as the gold product of choice. Leucocyte counts are carried out on the blood every second or third week. The first and second doses administered are of 25 milligrammes each, and then 50 milligrammes are given at each dose until a total of one gramme has been given. The interval between these doses is one week. Thereafter 50 milligrammes are administered once a month as long as the patient will return. Over the series of 29 patients treated, the improvement and/or remission rate was 89%. The incidence of toxic reactions was 6·6%, and the complete failure rate was 10·4%. As only the simplest laboratory tests are required to follow treatment, the authors suggest that chrysotherapy can easily be made a part of office routine in private practice.

Ulcerative Colitis.

L. M. Morrison (*J.A.M.A.*, January 31, 1953) describes the treatment of ulcerative colitis with salicylazosulphapyridine ("Azopyrin", "Azulphadine"). He reports improvement without cure in 58% of patients; 18% were intolerant to the drug, and 24% showed no improvement. Headaches, nausea, pains in the joints and dermatitis caused discontinuance of the drug in 21% of 60 patients treated over three years. The toxic effects ceased when the drug was stopped. Anæmia was another side-effect. After two or three courses of the drug during three years 18% of patients were symptom-free; 52% were improved by two to ten courses of the drug over three years, 24% were not improved, and 5% were worse. Another 60 patients were treated by diet, liver extract, vitamin *B* complex, sulphasuxadine, aureomycin, "Chloromycetin", antispasmodics, sedatives and opium derivatives; 50% of these showed improvement. Pyodermia, recto-vaginal fistula, iritis, depression and arthritis occurred in both groups. Arthritis cleared up with salicylazosulphapyridine therapy. The dose of this drug was from one gramme given thrice daily to two or three grammes given every three hours. This dose could not be tolerated for long. "Dramamine", "Pyribenzamine", antacids and frequent milk feeds often enabled the patients to tolerate the larger doses. The dose had to be adjusted to the patient. Cortisone, 25 milligrammes given three or four times daily, often helped the action of salicylazosulphapyridine.

Penicillin Anaphylaxis.

P. S. Meyer *et alii* (*J.A.M.A.*, January 31, 1953) describe six cases of penicillin anaphylaxis and discuss the frequency of the condition. They state that serum sickness occurs in 6% of patients receiving penicillin. Contact dermatitis, exfoliative dermatitis, fixed eruptions and urticaria are well known; anaphylaxis is less well known. Immediate anaphylactic shock is said to have occurred on the first injection of penicillin. More often anaphylaxis occurs after several injections of penicillin, or when penicillin therapy is resumed after an interval. In these cases, the results of skin tests with a solution containing 1000 units of crystalline penicillin per ml are positive. Intradermal injection of 0·01 ml of this

solution will produce an immediate urticarial weal. Each patient should be questioned about previous penicillin injections and reactions associated. The authors report six cases, in one of which the patient died after an intradermal test of the type described. In all these cases aqueous procaine penicillin was given, and the injection was followed rapidly by dyspnœa and collapse. Adrenaline, oxygen and artificial respiration were employed in treatment.

Dimercaprol (BAL) in Peripheral Neuritis.

T. C. GUTHRIE (*Arch. Neurol. & Psychiat.*, August, 1952) discusses the use of dimercaprol (BAL) injections in various forms of polyneuritis. He employed it in 18 cases (of varying ætiology) and continued his observations up to one year after treatment. He states that in all 18 cases there was no evidence that dimercaprol favourably influenced the course of the peripheral neuritis. Many of the patients were made worse during the treatment, and any patient who had had a previous attack of polyneuritis was likely to have a poor prognosis.

NEUROLOGY AND PSYCHIATRY.

Intellectual Impairment with Localized Cerebral Lesions.

J. MCFIE AND M. F. PIERCY (*Brain*, Volume LXXV, Part 3, 1952) present a detailed psychological study of 58 patients with localized cerebral lesions. Their results tend to confirm the view that impairment of retention and learning is related to the size rather than to the locus of any cerebral lesion. However, the abilities of verbal, numerical and spatial thinking are affected by lesions in specific locations, and their involvement in this way gives rise to clinical aphasia, acalculia, constructional apraxia and visual spatial agnosia respectively. The authors also consider that the ability to arrange pictures to tell a story bears some relationship to the frontal lobe functions.

Electroencephalographic Studies in Cerebral Angioma.

D. P. ROSENBERG (*J. Neurol., Neurosurg. & Psychiat.*, November, 1952) analyses the electroencephalogram in 55 cases of cerebral angioma proved by arteriography. The average duration of symptoms before the electroencephalographic examination was seven years. The angioma was right-sided in 25 cases and left-sided in 30. Twenty-three lesions were parietal in position, seven temporal, six occipital, seven frontal, five parieto-frontal, five parieto-temporal, one parieto-occipital and one occipito-temporal. Over half were supplied by the middle cerebral artery. The remainder were supplied in order of frequency by the anterior cerebral, posterior cerebral and vertebral arteries. Thirty-six patients presented with epilepsy or developed fits during the course of the illness, while 17 had an associated monoparesis or hemiparesis. Subarachnoid hæmorrhage occurred in 18 cases. The electroencephalographic analysis revealed 33% of normal or doubtfully abnormal records, while 67% of the patterns gave a lateralizing or localizing indication. A composite picture showed the following features: a low to moderate voltage α rhythm, possibly asymmetrical; irregular six to seven cycles per second activity on the side of the lesion, fairly localized, and/or high voltage two to three cycles per second waves showing phase reversal over the site of the lesion. The authors point out that these changes, with minor variations, are usually seen with other forms of cerebral tumour, so that the determination of pathological states by the electroencephalogram is at the most uncertain.

Peculiar Form of Peripheral Neuropathy.

C. ANDRADE (*Brain*, Volume LXXV, Part 3, 1952) presents an anatomical clinical study of an unusual form of peripheral neuropathy, characterized by generalized atypical amyloidosis of the peripheral nerves. He describes cases in detail and points out that the disease is familial in nature and is prevalent in certain districts of Portugal. He states that the ætiology of the disease is unknown and proposes that the evidence presented in his study clearly distinguishes it from the generally known peripheral neuropathies.

Primary Malignant Melanoma of the Spinal Cord.

A. B. KING, J. W. CHAMBERS AND J. GAREY (*Arch. Neurol. & Psychiat.*, August, 1952) describe two cases of the very rare primary malignant melanoma of the spinal cord in which the tumour was discovered early and operation performed several months before death. Detailed autopsies failed to disclose an origin within the central nervous system. In both cases an extensive seeding of tumour cells had occurred within the subarachnoid space, and in one case the cerebro-spinal fluid appeared black from free melanin. Treatment of the condition has been most unsatisfactory.

Psychiatry and the Law.

ZIGMOND M. LEBENSOHN (*Am. J. Psychiat.*, August, 1952) states that there is no fundamental conflict between psychiatry and the law. Only between psychiatrists and lawyers does the conflict persist. The chief cause for the mutual distrust and suspicion lies in ignorance of each other's functions, objectives and basic philosophy. The remedy lies in increased research and ever-widening dissemination of knowledge. The author gives the following paraphrase of the words of Claude Bernard: "Some time, he hoped, the day would arrive when the physiologist, the philosopher, and the poet (and, may we add, the psychiatrist and lawyer) would talk the same language and understand each other. Then a dynamic medicine would arise."

The Electroencephalogram in Cerebral Lipoidosis.

W. COBB, F. MARTIN AND G. PAMPIGLIONE (*Brain*, Volume LXXV, Part 3, 1952) give an account of the common pattern in the electroencephalograms of 12 patients from a consecutive series of 7305 cases. The pattern consisted of random sharp transient waves on a background of generalized slow waves. All the patients were under nine years of age, were mentally backward and had epilepsy. Three suffered from cerebral lipoidosis; this diagnosis was made but not fully confirmed in another three cases, while in the six remaining cases no demonstrable ætiology was found. Two adults with cerebral lipoidosis did not show the pattern. The authors contrast the electroencephalograms with those of other diseases causing epilepsy, particularly subacute progressive encephalitis and Schilder's disease. They conclude from their observations that the finding of this particular electroencephalogram pattern in an epileptic backward child makes a diagnosis of cerebral lipoidosis very probable.

Cortisone in the Treatment of Schizophrenia.

LINFORD REES (*J. Ment. Sc.*, July, 1952) has tried the effect of cortisone on a series of 12 schizophrenic patients, giving 300 milligrammes on the first day, 200 milligrammes on the second day, and 100 milligrammes on the third and fourth days. No significant improvement was noted either clinically or by means of psychiatric rating scales. One patient became worse during the treatment, but returned to his previous state afterwards. No change was recorded in the electroencephalogram. There was no evidence to suggest that cortisone given by the method described had any material therapeutic benefit in schizophrenia.

Prefrontal Lobotomy.

W. J. KANE, H. M. HURDUM AND J. P. SCHAERER (*Arch. Neurol. & Psychiat.*, August, 1952) report a series of 122 cases of lobotomy (transorbital approach). They state that in 64% of the total series the patients showed much improvement, and in 28·5% they were able to leave the hospital (the State mental hospital). The mortality rate was within the limits of international statistics. The descriptive types, duration of illness and age did not seem to be of prognostic significance, but the most valuable prognostic clues were the emotional factor (which they stress as important) and the type of course of disease as classified by Bleuler, as well as the type of previous response to electro-convulsive therapy. The authors also state that repeated lobotomy should not be considered before the end of one year's post-operative observation.

Psychological Aspects of Reducing.

HILDE BRUCH (*Psychosom. Med.*, September-October, 1952) differentiates two types of obesity, one dependent on variation in body build and the other symptomatic of emotional maladjustment. She states that in both cases the subjects suffer medical and social disapproval. In the "constitutional" type the patient accepts reducing as a rational and desirable procedure. In the "symptomatic" type overeating is a manifestation of frustration and is symbolic of the desire to be great. The resultant obesity leads to social humiliation and self-hatred, and reducing is undertaken in the hope of achieving social approval and success. If these are not obtained despite weight reduction, or if during or after the process there arises a conflict between the wish to be thin and the sense of power implied by being fat, serious mental disturbance or even psychosis may be precipitated. Three illustrative cases are recorded.

Special Articles for the Clinician.

(Contributed by Request.)

LXXIII.

PREGNANCY IN DIABETES.

Uncontrolled diabetes appears to be no bar to conception; neither does the duration of the disorder diminish fertility to any great degree. Although diabetic women frequently suffer from irregular menstruation, scanty menstrual periods or mastitis and show other evidence of uneven hormonal control, pregnancy, however unfortunate its destiny, does establish itself almost as readily as in the normal individual of parous vintage. Any practitioner may suddenly be confronted with the responsibility of guiding his diabetic patient through the endocrine whirlpool of a hazardous gestation. Fortunately, most women, however casual in their previous behaviour towards their disorder, cooperate extremely well throughout this period. The outcome is, however, considerably dependent upon their longevity as a diabetic, and to the extent to which vascular degeneration depends on the quality of their former discipline. The other factor of importance is the experience, technical skill and teamwork of the patient's physician and obstetrician. Today, no doctor is justified in dissuading a subject of uncomplicated diabetes from undertaking pregnancy, still less for sterilizing her on the grounds of diabetes. The risk is to the fœtus, not to the mother, and no evidence has yet been adduced to prove that a pregnancy permanently worsens the diabetic state. Pregnancy may reveal a condition of latent diabetes, which may subsequently remit or remain, but in most established cases much the same quantity of insulin is required after as before the beginning of gestation.

After the discovery of pregnancy, the practitioner must decide whether he is equipped to supervise the patient's management from the medical and obstetrical point of view, or whether this would be better performed at a large hospital with full consultative and biochemical facilities. It is the purpose of this article to indicate the chief rules to be observed by those who undertake such a task, but in general it is highly desirable that facilities for the estimation of blood sugar content are at hand. Next, a fresh physical review of the patient, with an assessment of her diabetic status and chances of success, is required. The presence of systemic hypertension, retinitis, albuminuria and arterial degeneration indicates long-standing diabetes and greatly diminished chances of a successful outcome. At the Joslin Clinic, pregnant diabetics are divided into five classes: in class A are those with diabetes of recent onset, in classes B and C those with diabetes of five and ten years' duration, and in classes D and E those of fifteen and twenty years' duration respectively. Patients in classes A and B have an almost normal expectancy of success, while those in classes D and E show a depressing record of frequent fœtal loss, usually occurring during the last six weeks before term. The overall viable fœtal wastage in good hands through all the classes is usually about 20% or about five times the "standard" figure.

Miscarriage may occur in the early months, sudden death of the fœtus may occur *in utero* in the later months, or the child may not survive the perilous first week of life. Frank renal insufficiency or gross insulin resistance are two indications for termination of pregnancy on which most will agree, but I have seen an occasional patient with retinitis and calcified iliac arteries crowned with success.

The patient must understand from the outset that a more than usual degree of obedience and cooperation is essential on her part, and that she must be prepared to submit to more frequent antenatal care than her non-diabetic sister. Weekly visits are required until her diabetes is under optimum control; and during these first weeks, an adequate supply of vitamins, iron and calcium is more important than extra protein or Calories. By the end of the third month, the patient should be satisfactorily stabilized on a diet of no less than 2000 Calories, containing 80 to 100 grammes of protein. During this time vomiting may disturb the food intake and even induce ketosis, although hyperemesis is not a recognized feature of the diabetic pregnancy. Little increase of insulin requirement occurs in the first trimester, but the vomiting of breakfast may render it advisable to reduce any protamine zinc insulin taken to a maximum of 30 units, and to delay the morning dose of soluble insulin until the conclusion of the meal, as hypoglycæmia may injure the early fœtus.

As pregnancy proceeds beyond the third month, the advent of renal glycosuria may render the routine urine test less reliable, and fortnightly estimations of blood sugar content one to one and a half hours after breakfast then become desirable. Lactosuria does not occur until the puerperium. Strict diabetic control is so important that it is essential to know exactly where the maximum peaks of blood sugar level occur. Avoidance of hypoglycæmia is also essential, and for this reason increments of insulin should be made only after a decision, albeit very approximate, of the renal threshold has been reached. Such increments are better in the form of four to eight units of soluble insulin added to the morning or evening dose, or to both. The physician must be prepared to increase the insulin dosage promptly during this middle period in some patients, and such a requirement often appears quite suddenly. Infections, even of the urinary tract, fortunately seem to be uncommon in the pregnant diabetic, but if they do occur the patient must at once make contact with her physician.

It is during and after the sixth month that the obstetrician and physician should collaborate more closely in supervision. The latter should record separately his own blood pressure findings, and weigh the patient on accurate beam scales, as well as look carefully for evidences of water retention and fœtal well-being. No patient can gain much fat on an intake of 2000 Calories, and sudden acquisition of too much weight usually means water retention in maternal tissue, uterus and fœtus, soon to be obvious as peripheral œdema and hydramnios. Frank toxæmia of pregnancy tends to occur in the last two months, so that the patient should be examined weekly at this time and admitted to hospital at the first sign of water retention or rise of blood pressure. Sodium-poor diets are then instituted, ammonium chloride in doses of 40 grammes with meals is added, and daily repetition of the above-mentioned investigations is put into practice. Mild toxæmia does not usually disturb the insulin : Calorie ratio.

Premature labour and sudden fœtal death are the two chief hazards of this last third of pregnancy, and may or may not be heralded by evidences of toxæmia. Because experimental work in 1945 suggested that these bitter events were associated with an inversion of the usual balance between chorionic gonadotropin, on the one hand, and œstrin and progesterone on the other, it was suggested by White, of the Joslin Clinic, that artificial correction of this imbalance, by exogenous hormone administration from the onset of pregnancy, would reduce fœtal mortality. She produced striking figures from her own practice to show that fœtal survival increased from 60% to 90% as a result of this treatment. This remarkable result has not been generally confirmed by British workers, perhaps because the excellent diabetic control of her diabetic patients made a large contribution to her success, perhaps because few clinics have the facilities of a hormone laboratory or few husbands the funds to cover the expense. For patients in Classes D and E, however, I feel that substitution hormonal treatment, for example, 25 milligrammes daily of stilbœstrol and progesterone, may well be used as a routine, as every possible assistance is required for such patients if disaster is to be minimized. There is no question about the authenticity of White's figures, and we must reserve judgement on her claims.

It is during the last two months that close collaboration between the physician and obstetrician assumes its greatest importance. Decisions must be made early about the time and mode of termination of the pregnancy, the pre-operative and post-operative care, anæsthesia *et cetera*. There is almost universal agreement today that the fœtus should be removed from the effects of potential maternal toxæmia as soon as it is reasonably viable and of sufficient size. It will be remembered that the babies of diabetic mothers tend to be large, over-hydrated and sluggish, so that mechanical reasons may exist for premature termination. Even with patients in classes A and B it is better not to allow the pregnancy to proceed beyond the thirty-seventh to thirty-eighth week. The presence of severe water retention, albuminuria or hypertension may call for even earlier action, while for patients in classes D and E it is becoming popular to unlock the uterus at the thirty-fourth to thirty-fifth week, that is, as soon as the infant is viable. Where a stillbirth has terminated a previous pregnancy after thirty-four weeks, it may be wise to interrupt a subsequent gestation at a slightly earlier phase. The difficulty is to know precisely, even with radiographic assistance, the exact age of the fœtus. (X-ray observation of the fœtus should be routine.) The mode of termination, whether by Cæsarean section or surgical induction, is also a matter for the midwife; but in general *primiparæ* are delivered by section, and *multiparæ* who have not previously had a section are delivered *per*

vaginam. There is no place for the uncertainties of medical induction, since abnormal presentation, congenital fœtal abnormalities and uterine inertia are all commoner than normal. The patient's carbohydrate and insulin intake should be disturbed as little as possible pre-operatively, and the procedure is best planned for the afternoon. Intravenous glucose drip therapy is often advocated during the operation; but as fluid can be taken so soon after modern anæsthesia, it does not seem desirable. Spinal or caudal anæsthesia can be used successfully or cyclopropane by inhalation. No morphine or other respiratory depressant is given beforehand in case the fœtus may be affected, nor should any muscle relaxant even be considered. Blood should be available, and the extraction of the fœtus should be carried out with dispatch.

All the months of care and consultation can be vitiated unless it is remembered that the baby should receive immediate planned attention. The infant should be drained with more than usual care and the stomach aspirated. It should be placed in a warmed crib under oxygen and receive no fluids whatever for forty-eight hours. It should be stimulated frequently, and if breathing is poor, three minims of "Coramine" can be administered. Atelectasis with cyanosis is common, so that deep respiration and crying are encouraged. Sometimes a hyaline membrane forms over the larynx and trachea, and must be dissipated by introducing steam into the crib. It will now be apparent why diabetic mothers should be confined in large modern obstetric hospitals where special experience has been gained in the management of this critical neonatal period.

The mother's health rarely gives rise to medical anxiety during the puerperium. A penicillin and streptomycin "cover" is continued, sweetened fluids are administered as soon as consciousness returns, and the daily insulin dosage is reduced by 25%, especially with the long-acting insulin. Requirements may remain high in a few cases, but usually they soon fall to a level slightly above those needed before the pregnancy. When no reduction is required in the puerperium, it is usual to find that a pre-partum curtailment has been necessary. The patient's pre-operative diet can be restored after twenty-four hours, and convalescence should perhaps be continued for a few days longer than routine. Lactation is generally unsatisfactory, and is better avoided from the outset.

Fœtal over-development, abortion and toxæmia are as common among women who are destined to become diabetic ten to fifteen years later as among diabetics themselves. This suggests that actual hyperglycæmia, ketosis and arterial disease must play a small part in these results. The chief factors are probably endocrine imbalance, especially hyperpituitarism, and premature placental senility. A history of successive overweight babies should lead to questions regarding a family history of diabetes and to a glucose tolerance test, while consideration should be given to the question of early termination of any current pregnancy.

Fœtal loss is still too high in diabetic pregnancies, despite recent gains. Hormonal therapy so far has not influenced the occurrence of somatic changes in the fœtus, but it may well play a part in maintaining the virility of the aging placenta.

The conclusion appears to be inescapable that primary fœtal changes are due to the pituitary diabetogenic hormone, and probably not much further reduction in fœtal loss will be seen until we understand more of the ætiology and arrest of diabetes itself.

KEMPSON MADDOX,
Sydney.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal North Shore Hospital of Sydney, Crow's Nest, New South Wales, on April 23, 1953. The meeting took the form of a series of clinical demonstrations by members of the medical and surgical staffs of the hospital. Part of this report appeared in the issue of July 25, 1953.

Cavernous Hæmangioma.

DR. ERIC GOULSTON showed a man, aged thirty-six years, who had a history of varicose veins of both legs for as long as he could remember and apparently dating from childhood. Examination showed considerable varicosity of the veins of both lower limbs, especially below the knees, with skin ulceration over both ankles. Port-wine stains were present on the lateral aspects of both legs, the backs of the heels and the lateral parts of the dorsal and plantar surfaces of the feet. Trendelenburg's test produced a positive result. At operation, each saphenous vein was doubly tied and cut, and the veins were stripped. After discharge from hospital the patient wore elastic stockings.

Carcinoma of the Thyroid.

Dr. Goulston's second patient was a male invalid pensioner, aged thirty-one years, suffering from chronic nephritis. He had been admitted to hospital in September, 1952, with a history of having noticed a lump in the right side of the base of the neck in January, 1950. He thought that it was an old piece of shrapnel. Recently, however, he had lost some weight and the lump had become hot and tender to touch. The lump was found to be situated under the right sterno-mastoid at the base of the neck, and was oval in shape, one and a half inches in diameter, freely movable and of firm consistency. No palpable enlargement was found of lymph nodes elsewhere, or of the spleen and liver. X-ray examination of the neck showed an opaque body behind the sternum, considered to be a piece of shrapnel. No other investigations revealed abnormalities. Biopsy of the lump revealed a capillary type of carcinoma of the thyroid contained within a dense fibrous capsule. It could not be determined whether it was a nodular carcinoma in the thyroid gland or a secondary deposit in a regional lymph node. Resection of the thyroid was deferred, because of a carbuncle behind the incision. By the beginning of November, 1952, the patient had lost further weight and complained of slight hoarseness of the voice. Right hemithyroidectomy was performed. A hard nodule, one-half inch in diameter and situated in the excised portion of the gland, was found to contain capillary carcinoma surrounded by normal thyroid tissue. Since the patient's discharge from hospital the hoarseness of voice had persisted, but in view of the advanced degree of the patient's chronic nephritis no further treatment was contemplated. Dr. Goulston said that the presence of a long-standing secondary carcinomatous deposit was not uncommon in that type of carcinoma of the thyroid.

Hirschsprung's Disease.

Dr. Goulston's last patient was a baby who had been born in December, 1951. Three days after the birth symptoms and signs suggestive of an acute abdominal emergency had developed, and plain X-ray examination of the abdomen revealed pneumoperitoneum. Laparotomy revealed a distended large bowel and a perforation of the caecum, which was oversewn; transverse colostomy was performed. The child progressed well, although the incomplete evacuation of a barium enema caused impaction of barium fæcoliths in the lower part of the bowel. In November, 1952, recto-sigmoidectomy was carried out, and the colostomy was later closed. Microscopic examination of the resected portion of the bowel showed the absence of Auerbach's and Meissner's plexuses. Dr. Goulston pointed out that that showed that perforated bowel in the newborn might occur as a complication of Hirschsprung's disease.

Stationary Carcinoma of Cervical Lymph Gland.

DR. T. F. ROSE showed a man, aged forty-five years, who had had a swelling in the lower part of his left anterior triangle for twelve years. Biopsy carried out early in the history was stated to have shown a rapidly growing anaplastic carcinoma. The tumour was then treated by deep irradiation and remained constant in size until about the middle of 1952, when it began to increase slowly in size. The patient also noticed a small separate swelling beneath the biopsy scar. Examination of the patient in January, 1953, disclosed a long sausage-shaped swelling in the lower part of the left anterior triangle, its upper pole at a level with the upper part of the thyroid cartilage, its lower pole in the thorax. It was smooth, and did not move on swallowing. The trachea was not displaced. A second smaller swelling beneath the biopsy scar was smooth and rounded, and apparently apposed to the main tumour. At operation, the mass was dissected off the carotid sheath with difficulty because of the radiation fibrosis on its superficial surface. The tumour was well encapsulated and smooth on its deep surface, presumably where the deep radiation had not penetrated. A well-encapsulated smaller tumour was also removed. Convalescence was uneventful, and a three months' follow-up showed no evidence of recur-

rence. Microscopic examination of the specimen showed a malignant neoplasm of alveolar arrangement which appeared to be epithelial in nature. Dr. C. S. Graham considered it to be a carotid body tumour. Dr. Rose commented that although the tumour was much lower down in the neck than was usual for a carotid body tumour, nevertheless that diagnosis explained why an apparently malignant growth had remained stationary for over eleven years.

Argentaffin Carcinoma of the Ileum with Rapid Local Metastasis.

Dr. Rose then showed a woman, aged fifty years, whose left kidney had been removed by Dr. Alban Gee in September, 1952, because it was destroyed by calculi. Convalescence was stormy, in that the patient developed generalized abdominal colic and distension. X-ray examination showed fluid levels with small bowel distension, and Dr. Rose performed laparotomy nine days after the nephrectomy. He found partial bowel obstruction caused by a small argentaffin carcinoma of the terminal part of the ileum, with a little infiltrating mass in the corresponding part of the mesentery. The whole was widely excised by triangular excision of bowel and mesentery with end-to-end anastomosis of the bowel. Convalescence was uneventful, but two months later the patient again developed partial small bowel obstruction with colic and distension. Operation revealed widespread recurrence of the tumour in the ileum and mesentery with invasion of the bladder fundus. Wide excision of bowel and mesentery was then performed with removal of the bladder fundus. Convalescence was rather stormy, but a follow-up examination five months later showed that the patient was very well with no evidence of recurrence. Dr. Rose said that the case demonstrated the speed with which an argentaffin tumour of the small bowel might progress. The tumours in the bowel were much more malignant than those of the appendix.

Unusual Sarcoma of the Thigh.

Dr. Rose then showed a man, aged twenty-seven years, who had had a large painless diffuse swelling in the adductor region of the right thigh for five months. At operation, a large, well-encapsulated, partially solid and partially cystic tumour was found lying between the *adductor longus* in front and the *adductor magnus* behind. At its inferior pole, some lipoma-like deposits had perforated the capsule. It was easily removed by dissection around the capsule, the muscles not being involved. At the end of six months no evidence of recurrence was found. Microscopically, the tumour appeared to be a malignant neoplasm, almost certainly a sarcoma.

Giant-Cell Tumour of Cervical Vertebra.

Another patient shown by Dr. Rose was a woman, aged twenty-one years, who, in October, 1952, had complained of a swelling in the left side of her neck of six months' duration. It had remained constant in size and caused no disability unless she sharply bent her head laterally, when a shooting pain would go down the neck to her left deltoid region. The swelling was firm, non-tender, smooth and rounded and lay beneath the muscles high up in the left posterior triangle. It was attached to the vertebral column, but there was no sign of nerve involvement. Six months later the findings were much the same. X-ray examination showed a round, partly ossified tumour, extending postero-laterally from the fifth cervical transverse process and neural arch on the left side. Bone destruction had taken place in the arch and spinous process and body of the fifth cervical vertebra. Dr. H. R. Sear suggested that it was a giant-celled tumour (osteoclastoma). The results of a Wassermann and a Casoni test were negative, and the findings from a full blood count were normal. It was suggested that a biopsy should be performed to confirm the diagnosis and then deep X-ray therapy be applied.

Cholecystectomy followed by Gastric Dilatation and Other Complications.

Dr. Rose then showed a man, aged thirty-three years, who, in July, 1952, had undergone cholecystectomy and choledochotomy after an eight years' history indicative of chronic cholecystitis and cholelithiasis with biliary obstruction. The gall-bladder was found to be chronically inflamed and full of numerous small facetted infective calculi. The cystic duct was dilated and full of similar stones. The common duct was dilated, but no calculi were found when it was explored. The common duct opening was sutured, and a tube was left down to the suture line. All went well for forty-eight hours; then the patient developed acute staphylococcal pneumonia, which was treated with appropriate antibiotics. On the third day the patient collapsed with a clinical picture of peripheral circulatory failure. He was vomiting copious amounts of "coffee ground" vomitus, but his epigastrium was only slightly distended. The stomach was immediately aspirated and continuous suction started. Nine litres of fluid were lost from the stomach in the next twelve hours. Intravenous therapy was instituted, and fluid balance was maintained with difficulty by means of blood, normal saline *plus* potassium, and serum. Cortisone also was administered. The blood urea content fell from 164 to 33 milligrammes *per centum* within the next fourteen days. In the same time, the very high figure of 146 milligrammes *per centum* for potassium output in the stomach contents fell to 30 milligrammes *per centum*, and the figure for sodium output fell from 300 to 200 milligrammes *per centum*. Recovery gradually occurred. Three weeks after the operation the pneumonia had subsided, as had the effects of gastric dilatation. The wound had healed as well as the track from the common duct. The patient was discharged from hospital six weeks after his operation. One month later he was readmitted with the symptoms and signs of a stone in the common bile duct. The effects subsided, and he was discharged from hospital one week later. He then suffered recurrent attacks of epigastric pain and jaundice at home, and these became so frequent and violent that he was readmitted to hospital in December, 1952 (five months after his operation). He was in great pain and was deeply jaundiced. It was decided with some reluctance to reopen the common duct, when the day before the date set for operation the pain and jaundice suddenly ceased. On the following day the patient passed a large gall-stone in his fæces. Since that time he had had no further pain or jaundice and was putting on weight.

Accidental Rupture of the Urethra.

Dr. Rose showed a man, aged twenty-eight years, who had been admitted to the Royal North Shore Hospital of Sydney in September, 1952, six hours after he had been hit on the right hip with a sheet of steel. Clinically it was obvious that the patient was suffering from a rupture of the urethra at the apex of the prostate due to dislocation of the pelvis involving the *symphysis pubis* and the right sacro-iliac joint. The dislocation had been almost completely reduced spontaneously. X-ray examination showed slight dislocation of the *symphysis pubis* with a fracture of the sacrum extending from the right lateral mass through the junction of the upper and lower two pieces in good position. A blood transfusion was given, and the bladder and urethra were explored through a lower mid-line incision. A large quantity of blood and clot was found in the retro-vesical space. The bladder was intact, but there was complete rupture of the urethra below the apex of the prostate. The prostate and bladder were displaced backwards with rupture of the pubo-prostatic ligaments. The line of dislocation of the *symphysis pubis* could be felt. A Tieman's urethral catheter was passed along the penile urethra, and its end brought out into the wound. The bladder wall was then incised and normal urine escaped. Another Tieman's catheter was passed through the bladder incision to traverse the prostatic part of the urethra in a retrograde manner. Its end was also brought into the wound. The ends of the two catheters were tied together, and the first catheter was drawn into the bladder through the now reconstituted urethra. A Foley's catheter was attached to the distal end of the Tieman's catheter and drawn through the whole length of the urethra to the bladder. This catheter was to act as a splint for the urethra as well as a drain for the bladder. The balloon of a Foley's catheter was inflated, and the catheter was fastened to a glass rod on the abdominal wall. A de Pezzer catheter was inserted into the bladder through the abdominal wound. Convalescence was very smooth. All catheters were cut in three weeks, and the patient had normal micturition. Three weeks later still he was allowed up on crutches, which he discarded six weeks later. Seven months after the accident he was very well.

Volvulus of Colon and Ileum.

Dr. Rose showed a man, aged sixty-two years, who had been admitted to hospital in August, 1952, with a four-day history of abdominal pain and constipation. Examination of the patient had disclosed general gaseous distension and tenderness of the abdomen. Investigation of the hernial orifices and rectal examination disclosed no abnormalities. Plain X-ray examination of the abdomen revealed a large gas-containing loop of bowel with a fluid level in the left hypochondrium, as well as smaller fluid levels elsewhere in the abdomen and dilatation of the small bowel. Passage of

a stomach tube produced only a few millilitres of fluid. At operation a volvulus was found affecting the terminal part of the ileum and caecum and the ascending and right half of the transverse colon. The bowel had twisted twice clockwise, but the mesenteric vessels, though congested, had not been occluded. The bowel with the large fluid level turned out to be the enormously dilated caecum, which was very fragile. All the segment of the right side of the colon concerned was on a long mesentery. The volvulus was untwisted, and the caecum was aspirated, as it was paper thin and dangerous to handle. A caecostomy was then performed as well as an appendicectomy, and the abdomen was closed. Convalescence was normal apart from slight wound infection, and eight months later the patient was well.

Acute Osteomyelitis of the Ilium.

Another patient shown by Dr. Rose was a boy, aged thirteen years, who had been admitted to hospital in June, 1952. Six days previously he had developed a carbuncle on his right knee. Four days later he complained of pain in the right buttock of increasing intensity, felt very ill and vomited rapidly. On admission to hospital the boy had a swinging temperature and was very ill. He lay on his left side with the right hip a little flexed, but the hip could be moved actively and passively despite increase of the pain in his buttocks. The right buttock was particularly swollen and tender. A healing ulcer was present on the skin of the right knee, and from it a hæmolytic *Staphylococcus aureus* was grown which was penicillin-insensitive, coagulase-positive and aureomycin-sensitive. A similar staphylococcus was grown from the blood. X-ray examination of the pelvis revealed no bony abnormalities. He was treated with penicillin and aureomycin with no effect, and his general condition deteriorated. On the fourth day after his admission to hospital the tenderness and swelling became more localized over the *gluteus medius* muscle. The area was incised, the incision going through the fibres of the *gluteus medius* down to the ilium, but it was only after the ilium was drilled that pus was revealed. The outer table was drilled in many places, from all of which pus was obtained. From this pus a similar staphylococcus was grown. The boy's condition had slowly improved and he had been well since, excepting that occasionally the wound broke down and a little pus was discharged. X-ray examination now showed osteosclerosis characteristic of old osteomyelitis but no sequestrum formation.

Lymphosarcoma of the Jejunum Causing Intussusception.

Dr. Rose then showed a woman, aged sixty years, who had been admitted to hospital in March, 1952, with a provisional diagnosis of pyloric stenosis. For ten years she had had attacks of upper abdominal pain relieved by vomiting. These had become very persistent during the past month, and she was now vomiting even fluids. After admission the intermittent pain and vomiting persisted, each attack being accompanied by dyspnœa and diarrhœa. Normal findings were obtained from all investigations, apart from cholecystography, which showed a non-functioning gall-bladder. The patient then had two very severe attacks, which presented the clinical picture of uræmia. Two months after her admission to hospital laparotomy was performed, and a lymphosarcoma was found affecting all layers in the upper part of the jejunum and causing an intussusception with consequent bowel obstruction. The affected area was resected and the bowel continuity restored by side-to-side anastomosis, as the proximal limb was dilated to at least twice the size of the distal limb. Five days after operation bowel function was restored. Eight days after operation the patient developed acute abdominal symptoms, and immediate laparotomy revealed a leak in the anastomosis, which had made no attempt to heal. The peritoneal cavity was full of jejunal content and very inflamed. The bowel was resutured, but four days later a jejunal fistula developed through the wound, which broke down and gaped widely, pouring jejunal content. The floor of the resultant ulcer was formed of coils of small bowel. Five weeks after the original operation, the fistula having ceased, the abdominal wall defect was repaired with "Nylon" weave. The wound then healed satisfactorily, except that the weave had to be removed because the wound commenced to discharge pus some eight months after the bowel resection. At the time of the clinical meeting the patient's condition was excellent.

Calcified Mucocele of Appendiceal Remnant.

Dr. Rose also showed a woman, aged sixty-five years, who had undergone appendicectomy at the age of ten years. She had been admitted to hospital in July, 1952, with a fourteen days' history of aching pains commencing in the umbilicus and radiating to the right iliac fossa, these being associated with loose motions. A hard, round, freely movable and non-tender mass could be felt in the right iliac fossa. X-ray examination showed this to be a large calcified mass. At operation this mass was found attached to the caecum where the base of the appendix should have been. It was removed, together with a small portion of the caecal wall to which it was firmly adherent. Gelatinous mucus was found inside this mass, the walls of which contained calcification and some muscle fibres. All else was fibrous tissue. Convalescence was normal.

(To be continued.)

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

SANITARY PRECAUTIONS ON SHIPBOARD.[1]

[*Australian Medical Journal*, Melbourne, February, 1865.]

THE importation of typhus fever into the colony by means of the Golden Empire is a matter which must generally engage the attention of the whole body of the profession and the consideration of which has hardly yet begun to take the form necessary for a calm and dispassionate discussion upon it. Meantime, however, we have no hesitation in denouncing in the strongest terms the neglect of those sanitary precautions on board that vessel to the non-observance of which the generation of the disease is obviously due. And thus we are compelled to remark upon the practice which obtains at home, of permitting the nomination of surgeon to passenger ships to rest with the owners instead of with the Emigration Commissioners. Only in this way can we explain the fact of a great many unsuitable men having been allowed to take the charge of ships. These have too frequently consisted either of young men just escaped from the lecture rooms or of those unhappy and degraded members of the profession whom habitual intemperance has rendered incapable of respectable or indeed of any practice. They engage for an almost nominal remuneration and are either unequal or indifferent to the performance of their duties. The consequence is that the ship becomes excessively filthy, and the wonder is not that epidemic disease breaks out exceptionally, but it does not present itself very frequently. If the home authorities reserved to themselves the right of nominating surgeons to appointments in passenger ships and insisted on their receiving a fair remuneration, the office would be sought for by those who really correspond to the description of "experienced surgeons", the stereotyped recommendation of shipowners in advertising for passengers.

Correspondence.

COMPULSORY CHEST X-RAY EXAMINATIONS.

SIR: It is hard to believe that Dr. Short is serious when he suggests in his letter printed in your journal of July 11, 1953, that "it would be far more logical to educate the public not to have their chest X-rayed every year".

Australia was one of the first countries in the world to introduce a routine X-ray examination of chests for all recruits in the armed forces, and made a considerable contribution in popularizing mass radiography as a most important procedure in the detection of pulmonary tuberculosis and other chest conditions in the apparently healthy. The Anti-Tuberculosis Association of New South Wales has been pioneering mass radiography among civilians since 1941. The editorial of THE MEDICAL JOURNAL OF AUSTRALIA of October 25, 1941, stated: "At the present time far too many sufferers from pulmonary tuberculosis are coming under treatment for the first time when they are in the last

[1] From the original in the Mitchell Library, Sydney.

stages of the disease. This state of affairs will not be changed until every section of the community is surveyed, and this means mass microradiography." The Federal and State Governments should be complimented by the medical profession that they made possible the realization of a measure which sounded a dream ten years ago.

I wish to assure Dr. Short that the statistics of all the people X-rayed as well as a detailed analysis of the abnormalities detected will be published in the near future. At the moment the figures for Flinders Ward (Sydney), although the diagnosis of several cases is not yet complete, are available. There are 26 newly discovered patients with pulmonary tuberculosis, bacteriologically confirmed (18 men and eight women), out of 13,494.

A typical case history is of Mrs. C.B., aged twenty-three, married, mother of two children, aged two years and nine months, at present four months pregnant, no previous illness, general condition good, completely asymptomatic, no family history of tuberculosis, no previous X ray. X-ray report: "Fibrotic lesions left apex with probable cavitation and more recent lesions in the left mid zone." Gastric contents culture was positive. This patient was admitted to the clinic's hospital and will be transferred shortly to the Eva Hordern Home, reserved for treatment of pregnant women. This case speaks for itself! According to Dr. Short, this patient should not have had an X ray, as she had no cough or ill health in any form and therefore would not have required treatment.

I could quote several other interesting cases, but space will not permit, but all these will be published at a later date. Among the newly discovered cases were two patients who have been suffering from diabetes for several years and who had no previous X ray.

The necessity for more hospital and sanatorium beds is not disputed, but mass radiography, as it is recognized by most experts, must remain the springboard for other measures of controlling pulmonary tuberculosis, and the legislation making it compulsory is a big step forward towards the eradication of the disease in Australia.

Professor Leslie Bank told the recent British Tuberculosis Association Conference (quoted in an editorial in *Tubercle*, August, 1952) that tuberculosis could get under control within ten years if we turned our minds from treatment to prevention. "The conception of prevention is hard to grasp and is dramatic only to the statistician. Its successes are negative. This does not have the same appeal as the wonderful recovery of Betty Smith saved by the skill and attention of doctors and nurses; nevertheless, a little imagination should tell us where we ought to put our main effort. Surgery is important, but limited, whereas in prevention we have the key to success. It includes the use of mass radiography, tuberculin testing, B.C.G. vaccination, contact examinations, propaganda and education among general practitioners and the public."

Yours, etc.,

C. RUBINSTEIN,
Medical Director, Radiological Surveys.

Anti-Tuberculosis Association of New South Wales,
Cnr. Crown and Foveaux Streets,
Surry Hills, New South Wales.
July 14, 1953.

SIR: Dr. Short's letter (THE MEDICAL JOURNAL OF AUSTRALIA, July 11, 1953) has a great deal of entertainment value, but when it ceases to be amusing it disturbingly reveals the non-appreciation of tuberculosis problems by some medical practitioners. I must, therefore, take issue with many of the statements made by Dr. Short.

Dr. Short's hesitation in matters tuberculous is clearly revealed by at least one flagrant contradiction. At one stage he says: "After all, tuberculosis has some symptoms and makes people sick. If it does not cause a cough or ill-health in some form, it requires no treatment." Soon afterwards he makes this opposite statement: "The most disturbing aspect of this is that early active tuberculosis is commonly a closed infection . . . benefits are thus denied to the patients requiring treatment when they are most amenable to treatment."

Is Dr. Short aware that a "closed infection", even if later found to be "open" through the aid of more elaborate pathological tests (that is, gastric contents *et cetera*), is usually asymptomatic, and such patients are in the majority perfectly well. If such a patient is "most amenable to treatment" when he has a "closed infection", how can this be reconciled with his earlier remark that "if tuberculosis does not cause a cough or ill-health, it requires no treatment"? Which is it to be?

To wait for tuberculosis to cause ill-health is to take us back to the medical mentality of twenty-five years ago, against which tuberculosis workers have been consistently fighting, because this mentality was fatal to both the patient as an individual and to the community. The medical practitioners are reminded that, in tuberculosis as well as in other chronic and insidious diseases, to wait for ill-health to develop until it reaches an obvious stage would not only be unsound medical practice but would be nothing short of criminal neglect.

Doctors engaged in tuberculosis work agree again and again that tuberculous patients should be reached in the pre-clinical, asymptomatic stage. Symptoms of ill-health are, so far as tuberculosis is concerned, preceded usually by extensive lung pathology which is more often than not irreversible. A patient who develops a cough or ill-health is very often beyond a successful and lasting recovery—even with the aid of all available advances in chemotherapy and surgery.

The most valuable single method of discovering asymptomatic cases is mass miniature radiography, and the fact that this has been made compulsory is sufficient proof of how important this instrument of detection is rated. Mass miniature radiography—notwithstanding its many pitfalls—is the greatest advance in the tuberculosis field since the discovery by Koch in 1882 of the tubercle bacillus and that of the X ray by Röntgen in 1885.

The fact that mass X rays can be taken without stripping examinees to the waist is an advantage and not a cause for sarcasm. I can assure Dr. Short that impressions made by such things as "falsies" do not interfere in the slightest with the proper reading of a film.

No one will dispute the proposition that it would be desirable to provide accommodation for cases already discovered. Even if this could be achieved the cases not known yet, but discoverable by mass miniature radiography, would still present the greatest cause for the perpetuation of this national scourge.

If we were to stop X-raying and mark time until we could catch up with the backlog of cases, what would happen? People who have the disease but do not know it would remain at large, free to infect all and sundry. We would have the satisfaction of knowing that all located cases are out of harm's way. But meanwhile the number of undiscovered cases would be building up to such proportions that within a few years we would have an incidence of disease that would make even the staunchest of us tremble.

Yours, etc.,

H. WILSON,
Medical Director.

Anti-Tuberculosis Association of New South Wales,
Cnr. Crown and Foveaux Streets,
Surry Hills, New South Wales.
July 14, 1953.

SIR: The Diagnostic and Research Bulletin recently circulated to doctors in this State by "The Educational Service, N.S.W. Anti-Tuberculosis Association Diagnostic and Research Clinic", calls for comment. Anybody not familiar with the position, reading this pamphlet, might be pardoned for believing that this clinic is the sole body responsible for tuberculosis control in this State. We do not wish to belittle in any way the work being done by the Anti-Tuberculosis Association clinic; it is timely, however, to emphasize that in the metropolitan area of Sydney there are seven other clinics actively engaged in the campaign against tuberculosis. It is true that this clinic, through the help of the Commonwealth Government, is engaged in mass X-ray surveys. It is also true that this clinic is not able to provide modern treatment of the type being employed by some of the other clinics in this city, notably those attached to the Royal Prince Alfred Hospital and the Royal North Shore Hospital. Patients from the Anti-Tuberculosis Association clinic must be referred to these and other hospitals to obtain this treatment. The most serious aspect of this essay in publicity, however, is the "go it alone" policy it seems to imply. In the campaign against tuberculosis, the only way in which success can be achieved is by a united effort by all interested parties. It is not in the common interest and perhaps is a little presumptuous for one clinic to arrogate to itself the authority to circularize the

medical profession in the manner of this bulletin. The only non-governmental body in Australia in a position to speak with authority on tuberculosis is the National Association for the Prevention of Tuberculosis in Australia (NAPTA), which includes specialists from all States in the Commonwealth. This body is, in fact, engaged in formulating a comprehensive scheme of education of the public and the medical profession in tuberculosis control.

Yours, etc.,

C. G. BAYLISS.
A. G. McMANIS.
COTTER HARVEY.
MAURICE JOSEPH.
G. BRUCE WHITE.

Sydney,
July 14, 1953.

Public Health.

THE POISONS REGULATIONS OF QUEENSLAND.

THE following is an extract of the *Queensland Government Gazette*, Number 78, of July 11, 1953.

Department of Health and Home Affairs,
Brisbane, 9th July, 1953.

HIS Excellency the Governor, with the advice of the Executive Council, has, in pursuance of the provisions of *"The Health Acts, 1937 to 1949,"* been pleased to approve of the following Regulations made by the Director-General of Health and Medical Services.

W. M. MOORE.

WHEREAS by *"The Health Acts, 1937 to 1949,"* it is amongst other things enacted that the Director-General may make Regulations: Now, therefore, the Director-General, with the approval of the Governor in Council, doth hereby make the following Regulations:—

"The Poisons Regulations of 1947," published in the *Government Gazette* on 21st June, 1947, are hereby further amended as follows:—

To paragraph (*a*) of clause (5) of Regulation 4 is added the following:—

(viii.) Antibiotic substances (for local application only) which are not specifically named in this Regulation.

Clause (5) of Regulation 7 is hereby repealed and the following new clause inserted in lieu thereof:—

(5) No wholesaler seller of poisons shall sell any restricted drug to any person other than on the written order of a medical practitioner, veterinary surgeon, pharmaceutical chemist, or a dentist as provided for by these Regulations.

To Regulation 50 is added a new clause (iv.), as follows:—

(iv.) States a false name and/or place of abode or address to a person authorised by these Regulations to sell or dispense or prescribe or administer a dangerous drug or a restricted drug.

Paragraph (*b*) of Regulation 84 is hereby repealed and the following new paragraph (*b*) inserted in lieu thereof:—

(*b*) Any inspector may at a place where a pharmaceutical chemist carries on business or at any dispensary of which a pharmaceutical chemist is in charge as an employee seize any books, papers, letters, or prescriptions, or any of them concerning which such inspector has reasonable ground for suspecting that any provision of these Regulations has been contravened.

The following substance is removed from Schedule I. (Poisons) and Schedule IV. (Restricted Drugs):—

Chloromycetin.

The following substances are added to Schedule I. (Poisons) and to Schedule IV. (Restricted Drugs):—

Chloramphenicol

1:2-diphenyl-3:5 dioxo-4-n-butylpyrazolidine (known as Butazolidin or Phenylbutazone).

Hexamethonium Compounds.

Pentamethonium Compounds.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JUNE 27, 1953.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	5(5)	..	..	..	..	..	..	5
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	2	..	..	..	1	..	3
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	..	5(4)	2(1)	..	..	..	..	..	7
Diphtheria	10(5)	..	5(3)	..	6(5)	2(1)	..	..	23
Dysentery (Bacillary)	..	9(9)	..	..	1(1)	6(5)	..	1	17
Encephalitis	1(1)	..	..	..	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	1	..	..	1
Infective Hepatitis	..	13(6)	..	..	10(4)	..	..	..	23
Lead Poisoning	..	..	..	..	1	..	..	..	1
Leprosy	..	..	..	..	..	..	3	..	3
Leptospirosis	..	..	..	..	..	..	..	..	..
Malaria	..	..	..	..	1(1)	..	..	..	1
Meningococcal Infection	1(1)	2	..	1	..	2(1)	..	..	6
Ophthalmia	..	..	..	..	2	..	..	..	2
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	10(7)	3(1)	4(4)	3(2)	..	..	..	..	20
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	26(22)	..	..	7(1)	..	3	..	36
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	11(7)	67(52)	2	7(3)	3(1)	2(1)	..	1	93
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	1(1)	..	..	..	..	..	1
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	27(19)	9(5)	5(3)	10(10)	7(3)	7(1)	..	..	65
Typhoid Fever	1(1)	2(1)	1	..	..	..	..	..	4
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

The following substances are added to Schedule V. (Dangerous Drugs):—

3-Methoxy-N-Methylmorphinan.

The following substances are added to Schedule III. (Poisons):—

Carbon tetrachloride.

Tetrachloroethylene.

The foregoing Regulations were made by me on the seventh day of July, 1953.

A. FRYBERG,
Director-General of Health and Medical Services.

W. M. MOORE,
Secretary for Health and Home Affairs.

Research.

FULBRIGHT AND SMITH MUNDT SCHOLARSHIP.

ADVICE has been received that Dr. Morris C. Davis, of Melbourne, has been awarded the United States Fulbright and Smith Mundt Scholarship for 1953-1954.

Notice.

AUSTRALIAN ASSOCIATION OF CLINICAL PATHOLOGISTS.

THE fifth annual general meeting of the Australian Association of Clinical Pathologists will be held in Brisbane on August 21 and 22, 1953. There will be a business meeting followed by a number of scientific papers and demonstrations. The initial meeting, the business session, will commence at 9.15 a.m. on August 21 at the Medical School, University of Queensland, Herston Road, Brisbane.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Harmelin, Elkan, registered in accordance with the *Medical Practitioners Act*, 1938-1950, Section 17 (i) (*c*), 315 New South Head Road, Double Bay, New South Wales.

Gray, Rex Justice John, M.B., B.S., 1951 (Univ. Sydney), 136 Prince Street, Waratah, New South Wales.

The undermentioned has applied for election as a member of the Victorian Branch of the British Medical Association:

Diggle, John Nelson, M.B., B.S., 1946 (Univ. Adelaide), 14 Kildare Street, Hawthorn East, Victoria.

The undermentioned have been elected as members of the New South Wales Branch, British Medical Association: Becker, Theodore, M.B., B.S., 1953 (Univ. Sydney); Booth, Daryl Frederick, M.B., B.S., 1953 (Univ. Sydney); Buchanan, Peter Bethune, M.B., B.S., 1953 (Univ. Sydney); Copeland, John Morton, M.B., B.S., 1953 (Univ. Sydney); Elliott, Ernest Arthur Val, M.B., B.S., 1953 (Univ. Sydney); Hammond, David Gwynne, M.B., B.S., 1953 (Univ. Sydney); Hart, William John, M.B., B.S., 1953 (Univ. Sydney); Long, Francis Leo, M.B., B.S., 1953 (Univ. Sydney); Lubimoff, Veronica Jarmena, M.B., B.S., 1953 (Univ. Sydney); Lucas, Frank Samuel, M.B., B.S., 1953 (Univ. Sydney); McGrath, Brian James, M.B., B.S., 1953 (Univ. Sydney); McInnes, Ian William Stuart, M.B., B.S., 1953 (Univ. Sydney); Mangraviti, Norman Joseph, M.B., B.S., 1953 (Univ. Sydney); Mills, Margaret Agnes, M.B., B.S., 1953 (Univ. Sydney); Randall, Clement William, M.B., B.S., 1953 (Univ. Sydney); Raschke, John Allen, M.B., B.S., 1953 (Univ. Sydney); Rollison, Ronald Andrew, M.B., B.S., 1953 (Univ. Sydney); Sanders, Gordon Edgecombe, M.B., B.S., 1953 (Univ. Sydney); Shaw-Smith, Keith James, M.B., B.S., 1953 (Univ. Sydney); Vance, Robert Edmund, M.B., B.S., 1953 (Univ. Sydney); Warden, David Barton, M.B., B.S., 1953 (Univ. Sydney); Wilkinson, Roma, M.B., B.S., 1953 (Univ. Sydney); Dormer, John Cecil, M.B., 1952 (Univ. Sydney); Chambers, Roland George (Surgeon Lieutenant), B.M., B.Ch., 1948 (Univ. Oxford); Churchward, Sydney Lewis, M.B., B.S., 1951 (Univ. Sydney); Hunter, Bruce Lowell, M.B., B.S., 1948 (Univ. Sydney); Genzel, Juliusz, registered in accordance with the *Medical Practitioners Act*, 1938-1950, Section 17 (i) (*c*); Kramer, Edith Marie, registered in accordance with the *Medical Practitioners Act*, 1938-1950, Section 17 (i) (*c*).

Deaths.

THE following deaths have been announced:

MORRIS.—Luther Morris, on July 1, 1953, in England.

JACOBS.—Morris Jacobs, on July 15, 1953, at Bendigo, Victoria.

Diary for the Month.

AUG. 4.—New South Wales Branch, B.M.A.: Organization and Science Committee.
AUG. 5.—Western Australian Branch, B.M.A.: Council Meeting.
AUG. 5.—Victorian Branch, B.M.A.: Branch Meeting.
AUG. 7.—Queensland Branch, B.M.A.: General Meeting.
AUG. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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